E N T E R I C F E V E R.

Thesis for the Degree of

DOCTOR OF MEDICINE OF THE

UNIVERSITY OF EDINBURGH.

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April, 1905.

E N T E R I C F E V E R.

S y n o n y m s.

The following are a few of the many names which have been given to the disease at differnt times; most of them have ceased to be applied to it, and only three or four of them are at present in anything like general use; Febris Mesenterica Baglivi,1696), Nervous Fever (Gilchrist, 1734), Slow Nervous Fever (Huxham, 1739), Slow Fever (Stroker, 1729), Febricula or Little Fever (1740) Pyretus Hemitritaeus (?) (Hypocrates), Febris Semitertiana (?) (Galen), Nervenfieber, Fievre Nerveuse. Low Fever, Febris Putrida (Riverius, 1623), Typhus Nervosus (Sauvages, 1760) Miliary Fever (Pringle and De Haen , 1760), Febris Lenta (Forestus, 1591), Typhus Mitior(1769), Febris Gastrica (Ballonius, 1640), Fièvre Meningo-gastrique (Pinel, 1798), Bilious Fever (Pringle, 1750), Febris Intestinalis Vel Mesenterica (Riedel, 1748), Synochus (1769), Temittent Fever (Sutton, 1806,) Common Continued Fever (Armstrong 1816), Gastro-Enterite (1816), Enteritic Fever (Mills, 1813,) Entero-Mesenteris Fever (Abercrombie 1820), Febris Mesaraica (Wendt, 1822, Typhus Fever of New England (Bartlett, 1824), Unterleisby-typhus (Autenrieth, 1822), Fever with Affection of the Abdomen (Allison, 1827), Fever with Ulceration , of Intestines (Bright, 1829), Abdominal and Darm Typhus (1820), Typhoid Fever (Louis, 1829), Dothinenterite, or Dothienteric, corrected later by Dothienentérite (Bretonneau, 1826), Infantile Remittent Fever (1836), Enterite Septicémique (1841), Mucous Fever (1846), Enteric Fever (Ritchie, 1846), Typhus Entericus Cebel , 1836), Biliogastric Fever (Copland, 1844), Gastro-enteric and Gastrosplenic Fever (Craigie, 1837), Endemic Fever, Autumnal Fever (Flint,Soil Fever Brown, 1855), Ileo-Typhus (Griesinger, 1857), Cesspool Fever, Pythogenic Fever (Murchison (1858), Sephimia (Hare, 1853), Mountain Fever (1870).

It has been objected to the name (Typhoid Fever" as a common designation for this disease that it tends to perpetuate the mistaken impression

that typhiod fever is only a modified typhus fever, and also that the word typhoid has been generally applied to the condition of the system which is common to a great many different diseases and which is not of necessity present in this. Although these objections are not without force, many prefer to use the name typhoid fever because it was the name given to the disease by Louis to whom we owe the first full and accurate description of it, as well as by reason of its being the name by which it is perhaps best known to the profession throughout the world. The writer , however, prefers to retain the name enteric fever. The name pythogenic fever rests upon a theory of the disease (its putrid source) which has never been proven and is now regarded as untenable.

D E F I N I T I O N.

Enteric fever is an infectious disease, due to the typhoid bacillus, usually lasting between three and four weeks, and associated with constant glands of the ileum, and with nlargement of the spleen and mesenteric glands. Its invasion is usually gradual and often insiduous. Sometimes the only symptoms present in the beginning are a feeling oflassitude, some gastric derangement, and a slight elevation of temperature; at others there are slight rigors or chilly sensations, headache, epistaxis, diarrhoea, and pain in the abdomen. The principal symptoms of the fully formed disease are a febrile movement possessing certain characters, headache passing into delirium and stupour, diarrhoea associated with ochre - yellow stools, tympanitis, pain and gurgling in the right iliac fossa, a red and furred tongue, which later often becomes dry, brown, and fissured; a frequent pulse; an eruption of rose-coloured spots, occurring about the seventh or eight day, slightly elevated above the surface, disappearing under pressure, and coming out in successive crops, each spot lasting about three days; prostration not marked in the beginning, but rapidly increasing, and occasionally deafness, sweats, and intestinal haemorrhages. When recovery takes place, the comvalescenes is usually tedious, and may sometimes be protracted by the occurrence of one or more relapses. The rapidity with which the symptoms are manifested, and the degree to which they are developed vary in different cases.

H I S T O R Y.

The scope of this essay does not allow of anything but a limited historical sketch of the growth of knowledge concerning the disease under consideration.

It is probable that enteric fever has come down to us from a remote antiquity. Certain passages in the writings of Hippocrates have been appealed to by Murchison and others in support of the opinion that enteric fever was a disease of at least occasional occurrence in ancient times; but although from the nature of its causes it is probable that it has occurred in all ages and whereever men have congregated in towns and villages, the description given by Hippocrates in the passages alluded to are not sufficiently full to render it at all certain that enteric fever had ever come under his observation. Indeed,there is no author of an earlier date than Spigeluis (De Febre Senutertiana, Frankf.) 1624; Opera Omnia, Amsterdam, 1745) whose writings furnish any positive evidence that he ever met with the disease. Spigelius, however, in spite of the doubt thereon upon his observations by Hirsch (Handbuch der Historisch - Geographischen Pathol, Stuttgart, 1881), would seem to have had opportunities of examining the bodies of thise who had died of it, since he gives an account of several autopsies, in whic h he says that the small intestine was inflamed and that that part of it next to the caecum and colon was frequently ulcerated. Penarolus (Observat Med. Pentacostae, Romae, 1652) also states that the intestines had the appearance of being spacelated in some cases observed by him in Rome a little later in the same century. Willis (Practice of Physick, translated by Samuel Pordage, London, 1684) would certainly appear to have been familiar with two forms of fever, which, from the description he gives of them could have been nothing else but enteric and typhus fevers. Sydenham (Works on Acute and Chronic Diseases, with a Variety of Annotations by George Wallis, London, 1788), also described a fever in which the prominent symptoms were diarrhoea, vomiting, delirium, a tendency to coma, and epistaxis, and which was distinguishable from febris pestileus by the absence of a petechial eruption. Baglivi (Opera Omnia Medico-practica et Anatomica, Paris, 1788) of Rome, in the latter part of the seventeenth century described the haemitritaeus of previous writers under the title of febris mesenterica and maintained that it was always accompanied by and

dependent on inflammation of the intestines and enlargement of the mesenteric glands. A similar observation was made soon after by Hoffmann (Opera Omnia Physice-Hedico, 1699), and by Lancisi (Opera Omnia, Geneva, 1718) in 1718. The later seems to have fully recognised the characteristics of the eruption, for he says it consisted of elevated papules which disappeared completely on pressure In 1759, Huxham described, under the title "slow nervous fever", a disease which there can be no doubt was enteric fever. He, moreover, points out very clearly the distinctions between this disease and another to which he gave the name of "putrid", malignant, petechial fever", and which was unquestionably, typhus. Sir Richard Manningham (The Symptoms, Nature, etc., of the Febricula or Little Fever, London 1746) also described enteric fecer under the title of "febricula, or little fever" In the preface of his work he calls attention to its insidious origin, and to the fact that its gravity was often underrated at its commencement. About the same time Morgagni (Cited by Hirsch, loc. cit.) described certain post-mortem examinations in which the lesions of the intestines, were evidently those of enteric fever. Riedel, Roederer and Wagner, Stoll, Rulty, Sarcome, Pepe, Fasano, Mayer, Wrenholt, Sutton, Bateman, Muir, Edmonstone Prost, Pietit and Serres, Criveilhier, Lermimier, and Andral are other authors whose works bear evidence that they were familiar with the symptoms or lesions of this disease.

The credit of having first distinctly pointed out the association between certain symptoms and the lesions of the solitary and agminate glands of the ileum appears to belong to Bretonneau (Cited by Trosseau, Arch. Gen. 1826) of Tours. He regarded the disease of the intestinal glands as inflammatory , and, therefore, gave to it the name "dothienenterie " or "dothienenterite" but, unlike Prost, fully recognised the fact that there was no necessary relation between the extent of the intestinal lesions and the gravity of the febrile symptoms. Hirsch (loc. cit.), however, claims this honour from Pommer. The lesions of the intestinal glands which occur in this disease were also fully known to Louis .

About this time the progress in pathology which observers were making was temporarily impeded by the fact that while enteric fever was of frequent occurrence in Paris typhus fever was comparatively rarely met with and had not been epidemic there for several years. Bretonneau, Chomel, Louis (Researches Anatomiques, Patholo giques et Therap-

eutiques

sur la Maladie connue sur les Nom de gastro-entente, ets., Paris, 1829), and indeed the greater number of contemporary French physicians accordingly fall into the error of supposi ng that the fever which was then commo n in England was incidental with that which they were describing, whil e the English physicians of that period, with but few exceptions, contended with equal strenuousness that there was but one form of continued fever, and that this was very seldom associated with disease of the intestines. In the second edition of his work Louis abandoned his former opinion, and admitted that the typhus fever of the English was a very different disease from that which formed the sub - ject of his treatise; but the confusion which existed in England in regard to this disease was not completely dispelled until the appearance in 1849 and the following two years of several papers on this subject by Sir William Jenner (Med. Chir. Trans., vol xxxiii; Edin. Monthly Jour. of Med. Sci. vols. lx. and x. 1849 --50; and Med. Times, vols xx, xxl, xxii, xxxiii, 1849 -- 51), in which it was conclusively demonstrated that typhoid and typhus fevers were separate and distinct diseases. In Germany, however, the identity of these diseases was recognised as early as 1810, about which date, or not long after, they received the names typhus exanthematicus and typhus abdominalis, by which they are still generally known in that country.

American physicians very properly claim the credit of having materially contributed to the knowledge of enteric fever. In 1824 the disease was described by Nathan Smith (Med. and Surg. Memoirs, Baltimore, 1831) under the name of typhus fever of New England, and in 1833, E. Hale, Jr. (Observations on the Typhoid Fever of New England, Boston Med. Mag. Dec. 1839), of Boston, published an account of three dissections of persons considered by him to have died of the disease. In reference to these cases, Bartlett (The History, Diagnosis, and Treatment of the Fevers of the United States, 1842) sayd that if the diagnosis could be looked upon as certain and positive it would constitute the first published examples of the intestinal lesions in New England. In February, 1835, William S. Gerhard of Philadelphia, who was then under the impression that the two diseases were identical, reported two cases under the name of typhus fever, the symptoms and post-mortem appearances of which he showed differed in no respect from those he had been accustomed to see in the cases of typhoid fever he had observed with Louis during his studies in Paris. The year after Gerhard, had, however, the opportunity of observing

an epidemic of the typhus fe ver, and was at once struck with the difference between the symptoms of the cases which then fell under his care and of those he had seen in Paris. He now points out (Amer. Jour. Med. Sci., Feb. and Aug. 1837) very clearly the differential diagnosis between the two diseases, and especially insisted upon the marked difference between the petechial eruption of typhus and the roselous rash of enteric fever. He showed that the latter disease was invariably associated with enlargement and ulceration of Peyers patches and with enlargement of the mesenteric glands, and that these conditions were never presented in the former. He also fully recognised the fact that typhus fever was eminently contagious, while, on the other hand, he was fully aware that typhoid fever was not contagious under ordinary circumatances, although in some epidemics he had strong reasonto believe it becomes so. The appearance of this contribution marks an epoch in the history of enteric fever. Murchison, when speaking of it, says that to Gerhard, and Penonock, (who was associated with Gerhard in his observations) certainly belongs the credit of first lcearly establishing the most important points of distinction between this disease and typhus fever. It is undoubtedly owing to it, more than to any other cause, that the differential diagnosis of these two diseases was perfectly understood by the great body of the profession in America long before the question of the relation which they bore to each other was definitely settled in this our country, or even in France. The honour of having first clearly pointed out the distinguishing characters of enteric and typhus fevers has also been claimed by Sir William Jenner, but, as has been shown above, his papers on this subject were not published until thirteen years after that of Gerhard appeared.

The entero-mesenteric alterations in five cases of undoubted enteric fever were, in 1835, described by Bartleee (Med. Mag. June, 1835) as corresponding exactly to those reported by Louis

In the same year, James Jackson, Jr. of Boston, published an account of the intestinal lesions observed by him in cases during the years 1830, 1833, and 1834; and again in a Report of Typhoid Fever, communicated to the Massachusetts Medical Society in June, 1838, says that the alterations of Peyer's patches had been noticed at the Massachusetts General Hospital previous to 1833 in cases which were very thoroughly examined. In 1840, Shattuck (American Med. Examiner, 1840) of Boston

gave an account of some cases of typhoid, and typhus fevers which he had observed at the London Fever Hospital in the previous year. In this paper, which had been already communicated to the Medical Society of Observation of Paris, and which had unquestionably e xerted a marked influence upon medical thought there, he pointed out very fully the distinguishing characteristics of each disease. Bartlett, in 1842, issued his work on the History, Diagnosis, and Treatment of the Fevers of the United States, which contains very full descriptions of both of these diseases, and of the means by which they may be distinguished from each other. Since then there have been numerous additions to the literature of enteric fever in various parts of the world. To Murchison (A Treatise on Continued Fevers, London, 1873,) however, is justly due the honor of having produced the most elaborate and classical treatise on the disease in any language.

G E O G R A P H I C A L D I S T R I B U T I O N

While it cannot be gainsaid that the conditions of civilisation favor the occurrence and extension of enteric fever, yet there is abundant evidence to show that they are not absolutely necessary to its production, as there is no country, whether civilised or not, in which it has not occasionally made its appearance, being met with in every variety of climate, the disease is endemic in the British Isles, in almost all parts of Continental Europe, and in North America. Hirsch loc. cit.) has reached the conclusion that its general prevalence in Europe and America dates no further back than the second and third decades of the nineteenth century - that is, from the period at which typhus became everywhere less common and in many regions disappeared altogether. In America it is endemic, attacking alike the inhabitants of Greenland and British America and those of Mexico; it prevails from time to time in every state of the Union, committing its ravages as well among the rocks and hills of New England as in the more fertile valleys of the West and South . In new and sparsely-settled American districts, where the land is being gradually brought under cultivation, malarial fevers occur; after a time, as populations increase, marlaria, and enteric fever prevail side by side; finally, when

the land has been generally taken up, drained and tilled for some generations, and villages and cities abound, malarial fevers impress communities but faintly or disappear altogether, while enteric fever becomes common and asserts itself as the predominent endemic fever in proportion to the neglect of the sanitary measures by which alone it can be kept in check in populous localities. Enteric fever has also occurred in Central America and the West Indian Islands. It has prevailed from time to time in the States of South America, and occasionally assumed in some of them - as, for instance, Brazil and Chile -- an epidmic form. The disease exists endemically in every country of the continent of Europe, from Sweden and Norway on the north to Turkey on the south, and in some of them -- as, for instance, France and Germany - would seem to be of particularly frequent occurrence as compared with this country. The literature is also not deficient in evidence that it has prevailed at various times in all the different countries of Asia and Africa, Australia, and in India . The disease is also far from uncommon in tropical and subtripical countries generally.

E T I O L O G Y

The etiology of enteric fever has completely changed since the confirmation of the suspicion, long entertained , that the disease is due to the entrance into a susceptible organism of a specific infecting principle --- the bacillus typhosus - through the agency of which the disease is spread.

PREDISPOSING CAUSES.

Amongst such we include all conditions which favour the development and accumulation of the infecting principle, as well as those conditions which increase the susceptibility of the individual to the cause of this particular fever and the liability of his exposure to it.

A G E

Age is of all conditions determining the individual predisposition the most important. According to all experience, the greatest predisposition is between the ages of fifteen and thirty. Thus, according to Murchisons' statistics, more than half (52 per cent.) of the cases brought into the London Fever Hospital were in persons from 15 to 25 years old, and that in more than a fourth, the patients were under fifteen years. On the other hand, in less than a seventh they were over thirty and in only one in seventy-one did their ages exceed fifty. Taking these facts in connection with the circumstance that the entire population of England and Wales in 1861 was 12.481.323 persons under thirty years of age and 7.584.901 above thirty, it follows, he says, that persons under thirty are more than four times as liable to enteric fever as persons over thirty. Children less than a year old are very seldom attacked, but from this period up to fifteen years old , the liability steadily increases. No age, however, enjoys a complete immunity from the disease. In 1864, Murchison showed at the London Pathological Society, the intestines of an infant six months old who had been attacked at the same time with her mother. Manzini (cited by Murchison) has been a case in which lesions of Peyer's patches similar to those f enteric fever were found in a seventh-month foetus which died within half an hour after its birth. Cases are also on record in which death had occurred from this disease in the first few weeks of life. The explanation of the fact that the proportion of cases occurring in infancy is

smaller than that of childhood, is sought in the increased exposure to the infecting principle at further on in life. It has, however, been suggested that enteric fever is even of more frequent occurrence in children than is generally supposed, as this class of patients is not often admitted into general hospitals, and the disease often escapes recognition owing to the absence of some of its characteristic symptoms when it occurs in those of tender years.

Taking the other extreme, enteric fever is not common in advanced life, though well authenticated cases in the elderly or aged have been reported. Thus 83 out of 5911 cases were observed at the London Fever Hospital in persons over fifty, 27 in persons over sixty and in 2 the age was seventy-five. In a case reported by D'Arcy the age of the patient was eighty-six, and in reported by Hamernyk it was ninety. It is many years now since Bartlett contended that the disease was not so rare as was generally supposed among persons over forty years of age; and there is really no good reason to believe that the susceptibility to the malady in an unprotected person diminishes with advancing years, the immunity from this disease which elderly persons appear to enjoy being probably due to the fact that, as the disease is common in early life, they are in many instances protected by having already passed through the attack.

S E X

With few exceptions, the statistics of all general hospitals show a greater or less preponderance of males over females among the enteric fever patients treated in them. This fact is not to be considered by itself as proof of that men are really more often attacked, for in most places more men than women seek hospital treatment. Accordingto Murchison, there were in the London Fever Hospital, out of 5.988 typhoid patients, 3.001 males and 2.987 females, during a period of twenty-three years. Of 891 cases admitted into the Glasgow Infirmary during twelve years, 527 were males and 364 females. According to Fiedler, there were in Dresden 862 males and 635 female typhoid patients, that in 56"6 per cent. of the former class and 424 per cent. of the latter. Occasionally the difference is even greater than is indicated by these figures. Thus, of 138 cases observed by Louis, all but 32 occurred in males. When, however, we consider that the proportion of men who apply for admission to hospitals when sick is much larger than women, we can scarcely

accept these statistics as proof that the former are more liable than the latter to be attacked by enteric fever. Indeed, the opinion which Murchison expresses is generally accepted as correct, namely that neither sex is more likely than the other to contract the disease. Furthermore, statistics that have been from time to time adduced to show that the disease is much more frequent in boys than girls embody the fallacy arising from a failure to appreciate the fact that beyond the age of infancy girls are much less exposed, under ordinary circumstances, to the infection than boys. The latter in theit out-door sports, bathing, swimming and the like, are not only in frequent danger of inhaling the concentrated emanations from sewers and drains, but are also subject to the liability of imbibing sewage-polluted water.

In contrast with many other diseases, enteric fever is said to attack, by preference , strong and healthy persons, while it avoids pregnant, puerperal nursing women. Nathan Smith, however, asserts that while the sexes are equally liable to it, more women are cut off by it than men, in consequence of its appearance in them during pregnancy or soon after child-birth.

SOCIAL POSITION AND OCCUPATION.

The influence of occupation in predisposing to enteric fever does not appear to be grat. The disease, however, seems to exhibit a marked predilection for the affluent and cultured classes of society. Why this should be is difficult to explain. Aome authors point to the arrangement of bath-rooms and water-closets in too close proximity to the bedrooms in the houses of the well-to-do.

CHANGE OF RESIDENCE.

It has been asserted that newcomers are much more liable to be attacked by enteric fever than persons who have lived for some time in an infected locality. In 129 cases, examined with reference to this point by Louis, the patients in 73 had not resided in Paris more than ten months, and in 102 not more than twenty months. Bartlett noticed that during an epidemic in Lowell which he had the opportunity of observing the disease attacked the recent residents in much larger proportion. than the old. Murchison's experience in reference to this point has been somewhat similar, for he found, upon examination of the records of the London Fever Hospital that 21·84 per cent. of the patients admitted for enteric fever had been

of London for less than two years . Almost all of these patients came, he says, from the provinces and were in good health and comfortable circumstances at the date of their arrival in London and for some time after. Moreover, a large proportion of them were first attacked within a few weeks after changing their residence from one part of London to another. He also refers to instances inwhich successive visitors at the same house at intervals of months, or even years, have been seized shortly after their arrival with enteric fever or with diarrhoea, fromwhich the ordinary occupants were exempt. Trousseau noticed that visitors to Paris were more liable to typhoid infection than the natives, and the experience of those who had studied the subject in places where enteric fever is rife is in agreement with these observations. Facts like these indicate with sufficient clearness that habitual exposure to the causes of the disease confers, to a certain extent at least, an immunity from their effects.

S E A S O N.

The season of the year appears to be a predisposing factor of great importance, Enteric Fever occurs with greatest frequency in this country, as it usually does elsewhere, during the latter half of summer, and the early part of autumn. Indeed, its greatest prevalence at this season than at other times has given to it the name of "autumnal fever" by which it is popularly known in many parts of England. On the other hand, the disease is at its minimum in May and June. Hirsch found that 519 epidemics of typhoid fever were distributed among the seasons as follows; in the spring 29; in the Summer , 132, in the autumn , 168; and in the winter, 140. Of 116, circumscribed epidemics occurring in France between 1841 and 1846 recorded by De Clawbrey, 20 began in the first quarter of the year, 21 in the second, 39 in the third, and 36 in the fourth. The number of cases however, does not immediately diminish upon the onset of cold weather. On the contrary, it has sometimes been observed that, after diminishing in November, they have shown a marked increase in December. Of 5.988 cases treated at the London Fever Hospital, Murchison says 759 were admitted in the spring, 1.490 in summer, 2.461 in autumn, and 1.728 in winter. Of the whole number, 27'7 per cent. were admitted in the two months ofOctober, and November, and in April and May only 7'3 per cent. Hirsch mentions that in Rio de Janeiro the maximum of the disease occurs in the months from March to June, or, in other words, in the

season which in that lattitude corresponds to our autumn. There are, however, some exceptions to the general rule of the greater prevalence of the disease during autumn. Bartlett, who was aware of its greater prevalence at that time, refers to an extensive and fatal epidemic, which he observed at Lowell during the winter and early spring; other places have had similar visitations.

The prevalence of enteric fever appears to the markedly influenced by the state of the weather as regards dryness and moisture. Hot and dry summer favour the development of the disease, cold and wet summers check it. This statement is supported by the concurrent testimony of observers in all countries. Dryness of the atmosphere alone does not, however, lead to an increase of enteric fever. In cities and other localities possessed of a system of underground drainage, warm damp weather often leads to an outbreak of the disease, while heavy rainfalls by flushing the drains remove the causes to which its origin and spread are chiefly due. On the other hand, outbreaks of enteric fever may be traced to theinfluence of abundant rains in washing the germs of the disease into the water used for drinking purposes especially when manured fields are the sources of its supply.

Buhl and Pettenkofer have endeavoured to establish a direct relationship between the prevalence of enteric fever and the height of the deeper springs of water. When the water rises the number of cases of enteric fever decreases; when the water sinks, the number of fever-cases increases. This relation holds true for Munich, Berlin, and some other places. It has not, however, been satisfactorily explained. The observation corresponds with the statement above made that enteric fever is much more frequent after hot and dry summers than after cold and wet ones. These observers seek to explain the varying prevalence of enteric fever in connection with the changes in the ground-water by the assumption that the ground-soil is the chief place of development for the germ of the disease. When the water-level sinks, the layers of earth, containing most organic substances and exposed to the air, undergo changes, which lead to the development of the fever-poison; when, on the contrary the subsoil water rises, these layers of earth are again coveredand the development of the germs is arrested. The views of Pettenkofer and his pupils lack confirmation, and have not been generally accepted. The theory fails to account , as pointed out by Murchison, for the connection which is frequently observed between defective house drainage

and outbreaks of typhoid fever, occurring irrespectively of any variations in the subsoil water. Furthermore, outbreaks of the disease have occurred under precisely opposite circumstances, as the outbreak at Terling in 1867, recorded by Thorne, which was coincident with a rise in the ground-water after drought.

D E B I L I T A T I N G C O N D I T I O N S.

Those in an inform condition or persons recovering from an illness do not appear to be more liable than others to be attacked by enteric fever. Some go so far as to say that the disease attacks by preference the robust, while it avoids those suffering from chronic ailments. Physical a nd mental fatigue, and intemperance, except in so far that the lower the powers of resistance against infection, do not predispose to typhoid fever.

I D I O S Y N C R A S Y.

On the other hand, much importance has been attached by authors to idiosyncrasy as a predisposing cause of this disease. There can be no question that it occurs much more frequently , and is much more fatal, in some families; What the peculiarities of constitution are which increase the liability to the malady are not definitely known.

I N S A N I T A R Y C O N D I T I O N S.

The time-honored theory that enteric fever is solely and essentially a filth disease has now been abandoned; Yet that filfth is an important factor in its causation is still recognised for it forms a suitable breeding place or means for the germ. The fons et origo of the disease is polluted water. All sewage-polluted water does not, however, contain the typhoid poison, but such water is more likely to do so than water not so defiled. This fact has been repeatedly proved in whatever places adequate water supplies and efficient sewerage systems have been introduced, with a view of making the sanitary conditions as ideal as possible.

EXCITING CAUSE.

THE BACILLUS TYPHOSUS.

It may now be regarded as settled beyond the shadow of a doubt that the cause of enteric fever is a specific bacillus.

We owe to Eberth (Brit. Med. Jur. Nov. 26, 1881; Virchow's Archiv, Bd. Lxxxi and Lxxxiii) the first definite ideas regarding it s characteristics. Investigating by means of sections , clarified by acetic acid, the spleen, the lymph nodes, Peyer's patches, the liver, kidneys, and lungs in twenty-three enteric fever cases, he found in the lymph nodes clusters of micro-organisms. Later, by staining with methyl violet, he demonstrated the presence of germs in scrapings from the spleen and lymph nodes of typhoid cases. Being unable to find any such microbes in other diseases, even when complicated with intestinal lesions, he claimed a specific relation to enteric fever for the bacillus he had discovered. Photomicrographs taken by Koch at the same time, and independently of Eberth, showed that he had observed this same bacillus in the liver, spleen and kidneys in cases of enteric fever. The discovery of Eberth was also confirmed by Meyer in Germany and by Coates and Crooke in our own country. A valuable contribution to the study of Eberth's bacillus was made by Gaffky, who, in 1884, first obtained it in pure culture in gelatin and on various other culture media. Gaffky, moreover, made a complete study of this micro-organism in which he reviewed its characters of morphology, distribution in the body, and experimental reactions in animals. He was unable to prove its pathogenic nature. Subsequent study has detected few errors in Gaffky's observations, but has generally confirmed them. Many fact, however, have been added in regard to the identification , biology, and pathogenic properties of this bacillus. One of the most striking features of its subsequent history is the attempt made by Roux and Rodet to identify the colon bacillus and the bacillus of Eberth - an attempt which aimed at nothing less than to rob the bacillus typhosus of all specific character and to re-establish on a biological basis the theories of Murchison. The doctrine, so ably defended by Murchison and his followers, that the specific cause of the disease may be generated do novo in sewage without the presence of enteric excreta is no longer tenable. There is no proof whatever that

enteric fever can, in the absence of the specific pathogenic bacillus of Eberth, be produced by the products of decay or decomposition, by tainted food, or by the action of other bacteria; nor is there any reason to believe that typhoid bacilli can originate from other microbes.

MORPHOLOGY.

The bacillus typhosus occurs in the form of very motile, slender rods, 1 to 3 μ long by 0 . 5 to 0 . 8 μ thick, sometimes growing out into pseudofilaments. The size of the rods varies considerably in specimens obtained from different sources. The bacilli from agar culture, grown at blood temperature, and from the tissues of animals and human beings appear smaller in all dimensions than when grown on gelatin and potato, on which media, especially at low temperatures, they frequently take the form of long threads. The single rods are straight, regular in outline, and with blunt but rounded extremities. In stained specimens from cultures they are often slightly curved. The bacilli from old cultures also often appear somewhat irregular in shape. They are readily stained with all the common aniline dyes, but easily part with their colour when treated with decolourising agents - e.g., the iodine solution of Gram. They are somewhat more difficult to stain than most bacteria, but there is no constant difference between them and other bacteria in this respect. Refractive granules are infrequently seen at the poles of the bacilli, especially in potato cultures. These are readily and intensely stained by aniline colours. There may also be vacuoles, situated at the poles or centrally or along the sides of the rods, which remain unstained. These appearances are not due to spore formation, but to retrogressive changes, for the cultures in question have less power of resistance than those of the usual type. Although Gaffky and others announced the discovery of spore formation, subsequent investigation has not substantiated their claim. The existence of spores has again been asserted by Almquist. From his description they would appear to be quite different from true endogenons spores, but in regard to their power of resistance no experiments were detailed. The movements of the bacilli may be described in the case of the smaller individuals as rapidly swinging and tumbling in character, the larger bacilli progressing in a more serpentine manner, which is most pronounced but slower in the longer threads. They

propel themselves by means of some ten or eighteen flagella which are distributed over the entire surface of the cell. These appear as slender sinuous threads from three to five times as long as the bacilli. Loeffler's stain - consisting of a solution of tannin and ferrous sulphate as a mordant, to which is added a certain proportion of a one-per-cent. solution of sodium hydrate with fuchsin or methyl violet -- shows up their appearances quite satisfactorily.

C U L T I V A T I O N.

Eberth's bacillus grows readily in a variety of culture media at "room temperature" , very scantily from 9° to 15° C., and most abundantly at 37° C (body temperature). Its development is impeded at 42 °C. The presence of oxygen is advantageous, but not necessary. It grows readily in gelatin, without producing liquefaction. Superficial colonies in gelatin, early in their development, have a somewhat characteristic appearance. They are transparent, iridescent, and have an irregular outline which is compared to that of a grape leaf. Deep colonies are spheroidal and of a yellowish colour, gradually changing to brown. Cultures in bouillon give it a uniformly cloudy appearance. No pellicle is formed on the surface. On potato the appearances of the growth is variable according as the reaction of the potato is acid or alkaline. The appearance described by Gaffky may be considered as ~~typhixxxxxx~~ typical. This consists of an "invisible growth " covering the entire surface and causing a smooth, glistening appearance. At times the growth is more luxuriant, and of a yellowish or brownish colour, resembling an ordinary culture of the colon bacillus. The bacillus typhosus grows feebly or not at all in solutions containing asparagin. It does not produce indol in solutions of peptone or in bouillon, nor does it cause fermentation of grape, milk, or cane sugar. It causes formation of acid from grape sugar, but no gas. It grows readily in milk, producing a slightly acid reaction but ~~not~~ does not cause coagulation. It turns strongly alkaline media which do not contain sugar. In regard to its power of reduction observations vary. According to Germano and Maurea, only a slight reduction of indigo sulphate of sodium takes place regularly in case of agar stab cultures, whereas the great majority of the members of the colon group are powerful reducing agents. Loesener states that there is only a slight difference in this respect. Nitrates are reduced to nitrites, and sulphide of hydrogen is evolved, but less energetically than the case of

other bacteria. Hugonneng and Doyen found that ~~that~~ both the typhoid and colon bacilli set free nitrogen in peptone solutions containing 1'5 per cent. of sodium or potassium nitrate. They are very similar in this respect, in both the degree and rapidity of the reaction. No pigment is formed by the typhoid bacillus. When filtered of living bacteria, the cultures produce marked symptoms of poisoning in animals from the toxins which they contain.

P A T H O G E N E S I S.

The bacillus typhosus is found, both soil and water, but only when these are polluted by the discharges from enteric-fever patients. Loesener claims to have discovered in five instances typhoid bacilli in soil and in tissues and faeces in which there had been a suspicion of their presence. They have never been demonstrated in the healthy body. During the course of enteric fever they are widely distributed through the body and in the excreta. Cultures are obtained with great certainty from the spleen and lymph nodes of the mesentery, in which the bacilli are constantly found scattered about in little clusters. This arrangement in scattered clusters is characteristic, and as a rule it is only in the walls of the intestine that they are observed singly or in loose chains following the course of the lymph vessels. There can be no question that the groups of bacilli are formed during life. The proof of this, according to Flügge and others, consists in evidences of retrogressive changes in the rods as shown by a poor reaction to stains. On the other hand, there is a possibility that the bacilli proliferate also after death. This distrobution in the tissues, although characteristic, is not peculiar to the typhoid bacillus, for the colon bacilli may be found similarly grouped. The typhoid bacilli show a preference for the lymphatic system, choosing first the solitary and agminated glands of the intestine, then the mesenteric lymph nodes, and lastly the spleen. The liver and kidneys are invaded to a less extent. Quincke and Stuhlen say they can almost always be found in the marrow of the bones. The distribution of the bacilli, in the body can be explained only by the theory that they enter the general circulation. This theory has also been confirmed by the direct examination of the blood. Although Gaffky, Janowski, Grawitz, and others have not been successful in such examinations, being perhaps deceived by contaminations with other bacilli, many positive results can be cited. Stern observed the

bacillus typhosus in 3 out of 6 cases, twice in the blood from rose spots and once in that from a vein. Banti succeeded in 1 out of 2 cases. Neuhans, in blood from rose spots, obtained cultures in 9 out of 15 cases examined. Fraenkel and Simmonds in 6 cases, found the bacillus once. Thiemich, examining the blood of seven cases, drawn both from veins and rose spots, obtained a growth of typhoid bacilli 3 times from rose spots and once from a vein. In 41 cases he examined blood taken from a vein with elaborate antiseptic precautions, and in 9 cases he obtained a growth of typhoid bacilli. By a similar method, of vein puncture, and using a smaller quantity of blood, James and Tuttle succeeded 3 times in 38 cases.

The blood stream may, of course , carry the bacilli to all parts of the body and they may be deposited in the central nervous system. Curschmann has reported a case in which he found them in the white substance of the spinal cord, distributed for the most part singly rather than in groups. The case presented symptoms resembling those of Landry's paralysis, and the spinal cord showed only unimportant histological changes. That the typhoid bacilli can also pass from the maternal circulation to the foetus has been shown by Neuhaus, Eberth, Fraenkal and Kiderlen, Hildebrandt and others. Frascani, in Experiments on animals , was regularly able to demonstrate the bacilli in the foetus.

Bacteriologists have frequently demonstrated the presence of the bacilli in the faeces of typhoid patients. It is probable that they are not evenly distributed through the faeces, and that they are most abundant during the period of active intestinal ulceration. The failure to demonstrate their presence at any given time in the disease cannot be considered proof positive of their absence. The identification of the typhoid bacillus in faeces is difficult at the best, and in the multitude of other similar bacteria it may easily escape detection. It is very often present in the urine also, appearing probablysomewhat later than in the faeces. Neumann obtained typhoid bacilli in cultures from the urine in 11 out of 48 cases, and once as early as the third day. Slight changes in the kidneys always take place in enteric fever, and they may sometimes be of a serious nature. The bacilli do not often appear in the sweat, but Geisler claims to have found them on one occasion. The assertion made by Siccard, that they may be present in the expired breath, is improbable. The discovery, by Lucatello, of typhoid bacilli in saliva,& in the mucous membrane of the larynx has not been confirmed. In 19 out of 22 cases Chiari found the

bacilli in the gall-bladder. How they effect entrance to that viscus has not yet been explained

Tissues immediately surrounding the groups of bacilli appear to undergo no histological changes. Many cases have been reported, however, in which typhoid bacilli have acted as the exciting causes of inflammation and pus formation, and their power in thie respect has been proven by experience on animals. Fraenkel has reported an encapsuled focus of pus in the peritoneum. Weichselbaum saw a case of general peritonitis following rupture of the spleen. Many have reported suppurative processes connected with the bones such as periostitis and osteomyelitis. Typhoid bacilli have also been obtained in pure culture in cases of suppurative meningitis, Flügge, in view of the possibility that other bacteria, after having assisted in the productions of thes lesions, have disappeared. fom the field, believes that there is no reason for assuming a specific typhoid form of inflammation.

RECOGNITION OF THE BACILLUS TYPHOSUS.

The importance of this is commensurate to the difficulty arising. Before the publication of Gaffky's researches, in 1884, microscopical appearances and certain peculiarities were depended upon for the recognition of the typhoid bacillus. Since that time improved methods of study and many important discoveries have shown that the morphology and staining properties of this bacillus are not sufficient to identify it and, indeed, are of comparatively slight importance. Brieger, in 1884, Emmerich, in 1885, and Escherich, in 1886, discovered in human faeces certain micro-organisms which, although given different names by their discoverers, were probably identical, or at least varieties of onespecies. The name given by Escherich to the organism isolated by him, Bacterium coli commune, has been retained in slightly altered form - viz; Bacillus coli communis or colon bacillus. The study of this bacillus by different bacteriologists seems to show that the term colon bacillus applies to a species which comprises many varieties of similar bacilli, but which are distinguished from each other by slight biological and microscopical differences. The colon bacilli in general closely resemble the typhoid bacillus in form, size, staining properties, biological characteristics, and pathogenic effects in certain of the lower animals. The distribution and arrangement of these bacilli in the tissues are practically the same as in the case of the typhoid bacillus. They are found constantly in the intestinal canal and faeces of human

beings and in those of many, if not all, of the lower animals, the problem, then, which has occupied the minds of bacteriologists has been to find a sure and rapid method of distinguishing the typhoid bacillus from the different varieties of the colon bacilli and such other bacilli as in any way resemble it. The slight difference in size may be disregarded as it is not constant and practically not appreciable. The distinguishing features which may be relied upon to identify the typhoid bacillus arethe following; (1) They are slender bacilli, which grow in gelatin without producing liquefaction, and present a somewhat characteristic appearance in young colonies upon the surface. When stain- they are readily decolourised by Gram's method. (2) The typhoid bacillus grows less rapidly and luxuriantly on all culture media than the colon bacilli (3) It regularly possesses a greater number (ten to eighteen) of flagella than the colon bacillus (four to eight.) It is also more actively motile. Indeed, except in very recent young cultures, the colon bacillus shows very little and often no motility. (4) The growth of the typhoid bacillus is invisible. while that of the colon bacillus is conspicuous and of a dirty yellowish colour. This difference, however, is not constant and is unreliable. According to Germano and Maurea, if, the suspected bacillus be planted on one half of a potato and on the other half a known culture of the typhoid bacillus, the slightest essential difference between the two growths proves the bacilli to be different. (5) The typhoid bacillus does not produce indol in peptone solutions. (6) It does not coagulate milk. (7) It does not produce gas in lactose or glucose bouillon; the colon bacillu coagulates milk and produces gas and indol under like conditions. Another difference emphasised by Loesener is the strong acid reaction produced in a certain medium by the colon bacillus. It produces more than twice as much acid as the typhoid bacillus in forty - eight hours.

It should be borne in mind that no single one of the above tests is sufficient to distinguish the typhoid bacillus from all varieties of the colon bacillus; it is only by the concurrence of all these tests, compared xxxx in each instance with a like test of a known culture of typhoid bacilli, that a suspected bacillus can be positively recognised as the typhoid organism. The results of animal inoculations are so varied and so little characteristic that such experiments are practically useless in determining the identity of the typhoid bacillus. The experiments of Pfeiffer and Kolle,

however, have demonstrated that animals which have been rendered immune to typhoid fever are as susceptible as usual to other bacteria of this group - e.g., to the colon bacillus. The serum of the immunised animals, sometimes in a dose of only a few milligrams, acts as a protection against typhoid bacilli only and not against the colon bacilli, and vice versa.

Mixtures like faeces are difficult from which to isolate the typhoid bacillus, as they contain innumerable bacteria of many varieties, some of them of very rapid growth and cause liquefaction of gelatin. To effect this purpose many methods have been devised. The value of any such method, next to its accuracy, is determined by its rapidity and simplicity in practice. Most of the methods thus far devised have failed in other hands to accomplish the results claimed for them by the inventors. A medium which will permit the growth of the bacillus typhosus while preventing or greatly retarding the growth of other bacteria, or a medium in which the appearance of the growth of this bacillus is sufficiently characteristic to distinguish it has been sought. The ability of the typhoid bacillus to grow is slightly acid media and in the presence of certain antiseptic agents has been chiefly relied upon. Unfortunately the bacilli of the colon group possess the same power and even in greater degree. Holz employed a preparation of gelatin in potato juice, to which he added a mixture of carbolic acid. The reaction of this medium was slightly acid. Elsner retained the slightly acid potato gelatin of Holz, but in place of carbolic acid added one per cent of potassium iodide. Upon this medium the typhoid and colon bacilli developed, while the growth of almost all other varieties, especially those producing liquefaction was inhibited. The growth of the colon bacilli was rapid, the colonies being easily seen at the end of twenty-four hours. On the other hand, the typhoid bacilli grew slowly, so that the colonies were scarcely visible after twenty-four hours, but at the end of forty-eight hours could be easily distinguished by their size and colour from those of the colon bacilli. Properly carried out, this method has yielded fairly uniform results. A plate in which the colonies are few and widely separated offers the best conditions for characteristic growth. When the colonies are thickly sown, the development of all is restricted, and the distinguishing features do not appear. Using Elsner's method, Sterling succeeded in isolating the typhoid bacillus in sixty per cent. of the cases

eaxmined. He considers it a decided improvement on previous methods. But the failure to demonstrate the presence of typhoid bacilli does not exclude the possibility of their presence. Diagnosis depends upon a positive result. A negative result is of little value. Loesener often succeeded in isolating the typhoid bacillus from the faeces by the use of simple gelatin, to which he added ·05 per cent. of carbolic acid. After the development of the colonies he transplanted into glucose agar a considerable number of ~~xxxx~~ the smaller ones which seemed most likely to be typhoid bacilli. He then subjected to further examination only the cultures in which there was no formation of gas. The time required for the practice of these methods makes them unsuitable for general purposes.

The above-mentioned by no means exhausts the list of methods devised. The coloured media, of Robin and Ramond, and those containing urine are well spoken of by many bacteriologists. The interesting experiments of Klie, also, with media containning different percentages of gelati n deserve mention. By the use of a medium containing 3 .3 per cent. of gelatin at 18° to 19 °C., he obtained, after tweny-hours to thirty-six hours, a fairly constant type of colonies of both typhoid and colon bacilli. The differences, however, were not sufficiently striking positively to distinguish them. These methods, although most of them are of little practical use, contain many suggestions and hints, and have contributed materially to the study of the subject. Hiss has devised a method which accomplishes the isolation and identification of the typhoid bacillus from faeces with not less accuracy and in shorter time than previous methods. Impressed by the observations of Baginsky, Rosenthal, and Klie in regard to the effects of medis of reducing consistence upon the the forms of colonies, especially of motile bacteria, Hiss aimed to utilise the facts discovered by them by making a medium which would have a semi-solid consistence at the temperature of the body. This method requires the use of two slightly different media containing both agar and gelatin and having a certain degree of acidity. One is for the use in plates and the other for tube cultures. The plate medium contains one per cent. of agar and 2.5 per cent. of gelatin. The proper consistence of these media is obtained at incubation temperature (30° to 40° C.) which also favours the rapid development of bacteria. At the end of sixteen to eighteen hours the development of the colonies in the plates is sufficient to show growth characteristics which are generally distinctly different in the typhoid colonies from those of the colon group.

The colonies which present the typhoid characteristics are now transplanted to the tube medium. After from sixteen to eighteen hours in the incubator, the entire medium is entirely clouded if the typhoid bacillus is present. On the other hand, none of the colon bacilli produces this appearance. Thus within thirty-six hours it is possible to isolate the typhoid bacillus from faeces - with remarkable certainty, as shown by the usual tests. The value of this method appears established, but it is not generally used owing to the importance of strict accuracy and the necessity for securing the proper degree of acidity.

The serum test requires to be used in a special way and only then is it of real value. The procedure consists in the use of a typhoid serum from an animal highly immunised against the bacillus typhosus. This is tested against the standard typhoid bacillus - agar culture -- and th e highest dilution ascertained which gives the complete reaction in one hour. The suspected bacillus is now tested similarly. Both specimens are those of the typhoid bacillus when they are equally sensitive to the serum, both give a complete reaction, in one hour in high dilutions - over 1 in 500, -- and respond to the other required tests.

Pfeiffer's test may be reserved for use in cases in which a bacillus gives all the morpological and cultured tests of the bacillus typhosus, but fails partly to satisfy the preceding test. It consists in injecting a ten-times-fatal dose of the suspected bacillus into the peritoneum of a guinea-pig, and a very small quantity of typhoid serum. From a highly immunised animal. If it is the typhoid bacillus, then the control animal injected only with the bacillus will die, but this animal will recover. The serum is specific; it only protects, in minute doses, against the typhoid bacillus; so that the animal will certainly die just like the control animal if the bacillus is not that of typhoid fever.

PERSISTENCE IN THE BODY.

The question of the length of time that the typhoid bacilli can exist in the body after the patient has recovered is one that has received considerable attention. It seems certain that the bacillus typhosus may remain alive in the body for months - it has been said years - under favourable circumstances. Buschke tells that cultures of typhoid bacilli were obtained from an old focus of inflammation in bone seven years after the time of original infection. Sahli states that he found typhoid bacilli in a pleural effusion fifty days after the beginning of enteric fever. Orloff demonstrated their presence in the granulation

tissue of a focus of peritonitis after six and a half months. Chantemesse saw them in the pus of osteomyelitis nine months after a severe attack of typhoid fever. Werth found them after eight months in the contents of a suppurating ovarian cyst. Valenti, Loriga, and Pensuti, and Fasching have found them after various shorter periods. Hinze was able to isolate them from the pus of a costal periostitis ten months after the termination of an attack of enteric fever.

VITAL RESISTANCE.

In all probability as spores are not formed by the typhoid bacilli, their power of resistance is not greater than that of other non-spore-bearing bacteris. They are not destroyed by moderate degree of heat. Sternberg found a moderate exposure of ten minutes to a temperature of 56° C. sufficient to kill them. Potato-cultures containing the refractive granules described by Gaffky as spores were regularly killed by a temperature of 60° C., in order to secure their destruction. An exposure to 65° C. for five minutes likewise kills them. Long exposures to very low temperatures does not seem to injure their vitality. Prudden found the typhoid bacilli alive after an exposure of more than three months in ice at 11° C. Janowsky states that exposure to direct sunlight for from four to eight hours will destroy them. It is with only moderate rapidity that drying destroys the bacilli. Gaffky and Puhl found them alive after three months. Uffelmann, testing them in dried garden earth, white sand, buckskin, and wood protected from sunlight, found them alive after from twenty-one to eighty- two days. But in experiments reported by Flügge and by Paffenholz, they always succumbed within five to fifteen days , when dried in thin layers

Typhoid bacilli may retain their their vitality in cultures for months when under favourable circumstances. Sternberg found them alive more than twelve months.

A number of observations have been made as to the length of time the typhoid bacilli may live in water. No definite rule can be formulated from these observations as they vary widely. Hochstetter, in 1887, working with distilled water, found five days to be the maximum duration of life of the bacilli in this liquid. Strauss and Dubarry found them alive in the sterilised waters of Ourcq and of the Vanne after eighty-one and forty-threedays. Hueppe, in the waters of a very impure well, found them alive for thirty days. In

this connection Jordan's experiments are interesting. He found that the age of the culture influences greatly the life of the bacilli in water. A fresh isolated culture possesses distinctly greater vitality than one which has been under cultivation several months. In sterilised lake water the typhoid bacillus does not multiply to any extent, but under certain conditions may maintain their vitality for more than three months. The colon bacillus under the same conditions, multiplies rapidly and remain alive more than eight months . In distilled water typhoid bacilli perish much more speedily than in water from a lake. Jordan found eighteen days to be the limit of vitality in distilled water for fresh cultures, while old cultures survived less than six days. A minute quantity, even 0.0126 per cent., of nitrogenous material causes a perceptible lengthening of life in distilled water, while in sterilised lake water a still smaller quantity suffices. These facts may explain the differences in the results obtained by various authors. The organic matter which may be introduced into the water with the specimen to be tested may be sufficient to prolong the life of the bacilli. In material conditions other factors - such as sunlight, alternate freezing and thawing, competition with other bacteria, etc. - may influence the vitality of the bacilli. Flügge ~~from~~ mentions that they usually disappear from water by the end of two weeks, but a much longer persistence may be seen under favourable circumstances.

Provided the medium be an alkaline reaction, typhoid bacilli, planted in faeces from persons in good condition and kept at a temperature of 17° to 20° C., may, according to Uffelmann, thrive for more than four months.

It is important to know how long typhoid bacilli can live in soil. Investigations with reference to this point are less numerous. Grancher and Deschamp have shown that they may remain alive in soil more than five and a half months. Karlinski concluded from his researches that they do not live more than three months. He states that they retain their vitality in the deepest layers of the soil longer than upon the surface where they are exposed to the sun. Martin found that in soil which was polluted with organic substances the typhoid bacilli speedily increased and multiply abroad; while in virgin soil, under like conditions, they diminished and quickly died out. In black mould both typhoid and colon bacilli maintained their vitality for more than fifteen weeks. In virgin soil no growth whatever occurred.

growth whatever occurred. Robertson also tested various soils, some of which he treated with dilute organic solutions, while others were not so treated. The results of his experiments show that typhoid bacilli are incapable of growing very rapidly in some soils, and that apparently they can survive from one summer to another. In soil containing no organic matter they did not survive. Cultures planted at a depth of eighteen inches grew to the surface. Those planted on the surface grew downwards only three inches. They did not spread laterally to any extent in his experiments, a result which differed from those observed by others. These experiments apparently prove that it is more dangerous to bury the excreta of enteric patients than to spread them upon the surface where they become acted upon by sunlight and desiccated. Firth and Horrocks have demonstrated the fact that the bacillus typhosus is unable to grow in any direction in soil, though it may be recovered after ten weeks and four days, that the main facts affecting the chance of survival in soil are excessive moisture or great deficiency; and that that the bacilli can be recovered up to the twenty-fifth day from drying sand and from soil dried to dust. With one exception in all, of these experiments, both in soil and fabrics, strong emulsions of cultures of the bacillus were used. In one case only was a typhoid stool used, and in that experiment the bacilli could only be separated from the fabric on the second and ninth days. It is not quite clear what happens when a typhoid stool is placed on, or buried in the soil without the addition of antiseptics. Under such conditions, according to Karlinski, the bacillus can be recovered after the lapse of three months.

Finally Heirn states that the typhoid bacillus planted in milk lived thirty-five days; in butter, twenty-one days; and in cheese, three days. Sitz found the bacillus to preserve its vitality for three days in a liquid containing 0·03 per cent. of hydrochloric acid. Strauss and Woertz found two hours' immersion in pure gastric juice or 0·09 per cent. hydrochloric acid sufficient to destroy it.

EXPERIMENTS ON ANIMALS.

Numerous attempts made to communicate typhoid fever to the lower animals having failed we believe the bacillus typhosus to have no specific pathogenic action on animals. Some bacteriologists claim to have succeeded in producing enteric fever experimentally, because, in rare instances, they have observed ulcerative processes in the intestine and a slowly

diagressive disease. In 184, Birch - Hirschfield by feeding large quantities of typhoid stools to rabbits, produced in some of them symptoms which in some respects resembled those of enteric fever. These experiments, however, were repeated by Bahrdt upon ten rabbits with an entirely negative result. Motchoutkovsky injected blood from typhoid patients into apes, rabbits, dogs, and cats with no better success. Walder fed to various animals both fresh and putrid discharges from typhoid patients and blood taken from the body after death. These experiments were likewise unsuccessful.

Gaffkyappears to have been the first to experiment with pure culture of the bacilli, placing them in the food of animals and injecting them into the peritoneal cavity and subcutaneously. Five apes were fed daily for a considerable time with pure cultures of the bacilli and the temperature of the animals was taken twice daily. The result was negative. Experiments upon rabbits, guinea-pigs, rats, mice, and other animals were also negative. & Cornil and Babes injected pure cultures into the peritoneal cavity and into the duodenum of rabbits and guinea-pigs without success. By a series of experiements upon different animals Fraenkel and Simmonds showed that pure cultures injected into mice and rabbits may cause the death of these animals, and that bacilli may again be obtained in pure culture from their organs. Although the symptoms produced in these animals were not those of typhoid fever, yet the fact that death was caused by the introduction of the bacilli was held to prove that the bacilli are pathogenic. In these experiments pure cultures of typhoid bacilli were injected into the peritoneal cavity in thirty-five mice, with a fatal result in twenty-seven cases. The results of these inoculations appear to be influenced to a considerable extent by the amount and the concentration of the culture injected. In a number of cases a dilute mixture failed to cause death, while a concentrated mixture, injected into the same animals later, succeeded. These facts would appear to support the theory that the fatal results are caused, not by the bacilli themselves, but by certain toxins developed by their growth in the cultures. Seventy-nine rabbits were treated also in different ways. Pure cultures were injected into the intestine five times, into the subcutaneous connective tissue five times, and once into the lung. Inhalation of the bacilli was tried twice. All of these experiments failed. Injections into the peritoneal cavity in twenty rabbits caused death in but two, and forty-six injections into a vein of the ear gave twenty fatal results. In the fatal cases the bacilli

were obtained from the spleen by culture and they were also demonstrated microscopically in sections. The arrangement of the bacilli in groups was precisely the same as seen in the spleen in cases of enteric fever in man. The fact that the comparatively large amount - one-third to two syringefuls - of pure culture used in these experiments caused death, after an interval of a few hours up tp two or three days, in only twenty-two out of seventy-nine cases indicates that the typhoid bacillus is only moderately pathogenic in rabbits. It is, however, to be remembered that differences in lesions and symptoms produced by a certain bacterium in man and animals do not prove that the bacteriu m in question is not pathogenic in such animals. In support of this statement Koch cites the different manifestations of disease by the anthrax and the tubercle bacilli. Germano Maurea succeeded generally in causing death in mice from one to three days by means of an intraperitoneal injection. of 0·1 c.c. of bouillon culture two days old. The pathological findings were similar to those in mice killed by the colon bacilli. The more quicly the animal died, the more numerous were the bacilli found in its body, as a rule collected into the characteristic little groups within the organs. In slower cases the bacilli could also be found both by culture and in sections, but in much smaller numbers. Proliferation of the bacilli unquestionably took place in the first case, while in the second the injected bacilli were disappearing,; but death resulted from their toxic action. The same thing occurs in guinea-pigs, according to Loesener, when 0·003 grn. of an agar culture one day old is injected into the peritoneal cavity, and of dogs and rabbits when intravenous inoculations are made with large doses. According to a number of experiments, subcutaneous injections of sufficient strength cause abscesses to develop which contain pure cultures of the bacillus typhosus, especially in dogs and rabbits. Fatal poisoning can also be caused by cultures sterilised by heat or by filtration, the process corresponding to that due to infection by living bacilli. Changes in the intestinal canal are the predominating features in these cases, as is true also of animals infected by the colon bacilli. The lymphatic system of the mucous membrane, the mesenteric nodes, and the spleen are often specially affected. Usually the body temperature rises for a short time and then falls rapidly to subnormal in animals. Brieger, investigating as to the chemical substances which are produced by the growth of the typhoid bacillus in cultures, in a

number of cases, found a deliquescent basic substance, but always in mere traces. He considered this to be a ptomaine. It was fatal to guinea-pigs in from twenty-four to forty-eight hours. According to Pfeiffer the typhoid toxins can be best demonstrated by killing fresh agar streak cultures with chloroform vapour, or by heating to 54° C. for one hour, and using the dead bacteria for injection. Three to four milligrams represent the fatal dose for a guinea-pig weighing 100 grn. High temperatures appear to destroy the toxin . By using freshly isolated cultures of typhoid bacilli, Chantemesse and Widal claimed to have caused not only the poisoning, but also the infection of mice and guinea-pigs. Old cultures became virulent when injected subcutaneously in these animals if at the same time a considerable quantity of sterilised streptococcus bouillon was introduced into the peritoneal cavity, Cultures from these an imals required less of the sterilised streptoccus bouillon to cause death in the second animal. After being passed in this way through a series of twenty-five animals the typhoid cultures became so virulent as to cause death without the aid of streptoccus bouillon. The disease thus produced was septicemic in character and had little resemblance to human typhoid. Sanarelli also increased the virulence of typhoid bacilli by sterilised cultures of colon bacilli and of the bacillus prodigious. Lépine and Lyonnet injected pure culture of typhoid bacilli into a portion of intestine of a dog, confining them in this situation by means of ligatures for three days. No symptoms of disease were produced. When the animal was killed, on the twentieth day, no lesion of the mucous membrane of the intestine was found, nor was the spleen increased in size. The mesenteric lymph nodes, however, were greatly swollen. The infe ction was general and of the nature of a septicaemia. The blood serum produced the characteristic reaction of Widal in strength of one to one hundred. It is a more difficult matter to infect or poison animals by the mouth. The experiments of the earlier writers were failures, and the later ones have given few successful results and these have not been uniform. The same is true of inoculations in the intestinal canal. According to Cygnaeus, infection by inhalation seldom causes a reaction. The immunising experiments of Pfeiffer and others have demonstrated that the bacillus typhosus produces a specific effect in animals comparable to that in human beings, although differing in lesions and symptoms. Animals immunised in the usual way by repeated small and increasing

doses of typhoid bacilli, are proof against these bacilli and their toxins, but are not against the colon bacilli. The reverse of this is also true. These results have been fully demonstrated by different experimenters and are constant. This may be considered the final proof both of the identity of the typhoid bacillus and of its specific nature. Further , from animal experimentation we may conclude that typhoid bacilli are capable of proliferating in the bodies of living animals only when taken in large doses, and then only to a limited degree; also that the animals are killed by a toxin produced by the bacilli, which acts chiefly on the intestinal canal. The lesions in xx animals which resemble those due to the typhoid process are seen also as a result of infection by the colon bacilli. Enteric fever as seen in man has not yet been satisfactorily reproduced in animals. Experiments with cultures given by the mouth or by intravenous injection have failed to give positive results, though Remlinger seems, in the case of rabbits and white rats, to have demonstrated, that ; by means of the bacillus typhosus, enteric fever can be communicated to animals.

M O D E O F C O N V E Y A N CE.

C O N T A G I O N.

For long much diversity of opinion existed i n regard to the contagiousness of enteric fever. In the early part of last century there were quite a number of good observers who held the opinion that it was an eminently contagious disease. At the present time, however, the large majority of physicians, whose opportunities for observation give weight to their opinion, consider that the disease is not actively contagious, in the sense in which scarlet fever and measles are, that is, there is no danger in being simply in the immediate presence of a typhoid patient. Other patients in the same ward with typhoid sufferers almost never contract the disease from them. Attendants, do, however, a little more frequently, and this is undoubtedly due in most instances to their handling the clothing, the bed linen, and the utensils of various kinds which have come in contact with the patient, and have been soiled with the discharges. Yet even such cases are rare. Murchison states that in twenty-three years, in which 5.988 cases were treated in the London Fever Hospital, only 17 residents co ntracted the disease, and most of these had no personalcontact with the sick. Osler

mentions that, during six years, on 7/4 one nurse, one orderly, and one patient contracted the disease in his wards.

Clothing and bed linen which have been soiled by the patient, mattresses and utensils such as urinals and syringes, may convey the disease to others, not in immediate attedance. The statistics of the London Fever Hospital show that laundresses are more liable to contract enteric fever than the immediate attendants upon the sick. Their liability is gravest in those cases in which the bed linen and clothes of patients are not immediately disinfected after use. The Committee of the Clinical Society concluded that typhoid infection may be conveyed by fomitles and may be retained in them probably for two months at least.

It is natural to suppose that typhoid infection may be conveyed by flies and similar insects. They convey the bacilli from the dischages, and directly infect others, or deposit the poison on the food. Simmonds, Craig, Burgess, Hoffmann, Veeder, Sangree, and others have shown that microbes may be conveyed by flies. Many of the instances in which people living in the same house are attacked by typhoid fever can be explained in this way. Such a method would depend upon gross neglect of sanitation, involving the exposure of infected excreta. Under ordinary circumstances flies practically could only become potent by carrying the infection to water and so distributing it. Apart from this they can only give rise to sporadic cases.

Formerly the transmission through the air, either directly from the patient or from decomposing refuse, as by sewer gas or from old collections of dust, was held to be an important mode of propagatio n of the poison. This is now considered to be of very rare occurrence. It has been shown that dry bacilli may be suspended in the air Some have thought they have found them in the dust of a building where there had been cases of typhoid fever. Others believe that the gas escaping, from open drains, or air, blowing over polluted soil has been an important factor in causing attacks of enteric fever, but where these unfavorable conditions exist there are doubtless other ways through air by which the bacilli may have been spread.

Since the time of Budd the markedly contagious character of typhoid stools has been considered established. It is certain that the bacilli escape from the body for the most part in the faeces and urine.. Since the methods of separating bacillus typhosus from other bacteria have been

improved they have been demonstrated in the faeces in more than a half of the cases examined. Richardson found them in ten out of thirteen patients, in ninteen out of fifty-five specimens. It has been said that typhoid bacilli may be present in the faeces of persons not suffering from enteric fever; thus Remlinger and Schneider claimed to have found them in fifty per cent. of non-typhoid cases. One other such case has been reported in an attendant upon enteric patients. Richardson examined the faeces of non-typhoid patients during life seventeen times and post mortem twelve times; and wa s never able to find any typhoid bacilli in them. They may remain in the gall bladder for long after the attack. The bacilli, may, therefore, pass into the intestines, and be discharged from the body when there is no manifestation of fever. The urine has also been found to contain typhoid bacilli for weeks and even months after recovery. They are said to become more abundant in the faeces when the stage of sloughing in Peyer's patches arrives. They are sometimes found as early as the seventh day and usually disappear soon after convalescence has set in. They have been seen forty days after the temperature had become normal. Richardson found typhoid bacilli in the urine in nine out of thirty-eight typhoid patients, in forty-four out of one hundred and seventy-two specimens. When found, they were in large numbers and in nearly pure cultures. They appeared first in the later stages of the attack, generally persisti ng far into convalescence; in two cases they were found ten days after the patients had been discharged from the hospital. They were nearly always associated with albuminuria and casts.

According to Budd, the sputum in cases of enteric fever where bronchitis is excessive may sometimes contain the germs of the disease; he mentions a case in which they were believed to be responsible for the propagation of the disease.

The bacillus typhosus has also been found in the perspiration

The propagation of enteric fever has been more frequently, clearly, and strikingly shown to occur be means of drinking-water than in any other way. There are a very number of cases recorded in the literature. A few of them shewing most strikingly the origin of this disease from the water supply may be cited at this juncture.

ILLUSTRATIVE CASES. (1) Cayley (Brit. Med. Jour. Mar. 15. 1880) writes that Lansen is a village lying on the railway between Basle and Olten shortly

before coming to the great Hauenstein Tunnel. It is situated in the Jura, in the valley of the Ergolz, and consists of 103 houses with 819 inhabitants. It was remarkably healthy too on that account, as a place of summer residence. With the exception of six houses it was supplied with water by a spring with two heads which rises above the village at the southern foot of a mountain called the Stockhalder, composed of oolite. The water is received into a well built covered resevoir, and is distributed by wooden pipes to four public fountains, whence it is drawn by the inhabitants. Six houses had an independent supply - five from wells, one from the mill-dam of a paper factory. On August 7, 1872, ten inhabitants of Lausen, living in different houses, were seized by enteric fever, and during the next nine days fifty-seven cases occurred, the only houses escaping being those six which were not supplied by the public fountains. The disease continued to spread, and in all 130 persons were attacked , and several children who had been sent to Lausen for the benefit of the fresh air fellill after their return home. A careful investigation was made into the causes of this epidemic, and a complete explanation was forthcoming. Separated from the valley of Ergolg, in which Lausen lies, by the Stockhilder, the mountain at the foot of which the spring supplying Lausen rises, is a side valley called the Furjust, traversed by a stream, the Furlenbach, which joins the Ergolz just below Lausen, the Stockhalder occupying the fork of the valley. The Furlenthal contains six farm houses, which were supplied with drinking-water, not from the Furlenbach, but by a spring rising in the opposite side of the valley to the Stockhalder. Now there was reason to believe that under certain circumstances water from the Furlenbach found its way into the Stockhalder into one of the heads of the fountain supplying Lausen. It was noticed that when the meadows of one side of the Furlenbach were irrigated, which was done periodicallyy, the flow of water into the Lausen spring was increased, rendering it probable that the irrigatio n water percolated through the superficial strata and found its way under the Stockhalder by subterranean channels in the limestone rock. Moreover, some years before a hole on one occasion formed close to the Furlenbach by the sinking in of the superficial strata, and the stream became diverted into it and disappeared, while shortly afterwards the spring of Lausen began to flow much more abundantly . The hole was filled

up, and the Furlenbach resumed its usual course. The Furlenbach was unquestionably contaminated by the privies of adjacent farm houses; the soil-pits communicated with it. Thus, from time immorial, whenever the meadows of the Furlenthal were irrigated the contaminated water of the Furlenbach, after percolation, through the superficial strata, and a long underground course, helped to feed one of the two heads of the fountain supplying Lausen. The Natural filtration, however, which it underwent rendered it perfectly bright and clear, and chemical examination showed it to be remarkably free from organic impurities, and Lausen was extremely healthy, and free from fever. On June 10th one of the peasants of the Furlenthal fell ill with enteric fever, the source of which was not clearly made out, and passed through a severe attack with relapses, so that he remained ill all summer, and on July 10th a girl in the same house, and in August a boy were attacked. Their dejections were certainly, in part, thrown into the Furlenbach; and , moreover, the soil-pit of the privy communicated with the brook. In the middle of July the meadows of the Furlenthal were irrigated as usual for the hay crop, and within three weeks this was followed by the outbreak at Lausen. With the object of demonstrating the connection between the watersupply of Lausen and the Furlenbach, the following experiments were performed. The hole mentioned above as having on one occasion diverted the Farlenbach into the presumed subterranean channels under the Stockhalder was cleared out, and eighteen hundredweight of salt were dissolved in water and poured in, and the stream again diverted into it. The next day salt was found in the spring at Lausen. Fifty pounds of wheat flour were then poured into the hole, and the Furlenbach again diverted into it, but the spring at Lausen remained clear, and no reaction of starch could be obtained, showing that the water must have found its way under the Stockhalder, in part by percolation through the porous strata, and not by distinct channels.

(2) In 1872 an epidemic of enteric fever occurred at Stuttgart. The meadows from which a portion of the Stuttgart aqueduct receives its supply, were in the beginning of the winter of 1871 --72 thickly manured with the contents of the city sewers. In January there was a thaw with rain, and the water of this aqueduct became of a yellow colour, with an offensive smell. This was not produced by inorganic substances, and examination showed the presence of large quantities of

organic matter. In February an epidemic broke out in the portion of the city supplied by this aqueduct, so severe that there was an average of one typhoid patient for every two houses. In a neighbouring district , partly supplied with water from the same aqueduct, there was an average of one patient to every ten houses. In the rest of the city the disease was not more frequent than at ordinary times, averaging one case to every one hundred and forty-four houses.

(3) In 1898 there was an epidemic of enteric fever at Maidstone in which 1.908 cases of the disease were reported, out of a population of 35.000. Different districts of the town were supplied with water from different sources; almost all of the cases occurred in those districts receiving their water from a single source. A number of cases, it is true, occurred in that part of the town which did not receive water from this source; but this can be readily accounted for by the fact that the inhabitants did not, of course, remain in the same district , but visited in different parts of the town, and by the further fact that articles of food and other contaminated articles may have conveyed the disease from one district to another. The water which supplied the most severely affected portions of the town came in part from resevoirs so located as to be liable to contamination; one of them was very close to a heap of refuse where crowds of hop-pickers were in the habit of defaecating and also to a gipsy camp.

Milk has been shown very clearly by Ballard (On a localised outbreak of Typhoid Fever in Islington, London, 1871) to be a medium of communicating the disease. He found that an epidemic which occurred in the parish of Islington, London, in 1871, was (1) almost entirely confined to a district comprised within a circle having a radius of not more than a quarter of a mile; (2) that out of 62 families living within this district, who were known to have suffered from enteric fever, 54 were constantly supplied with milk from a particular dairy, and it was satisfactorily proved that at least three of the remaining eight had occasionally partaken from the same source; and (3) that out of 142 fa milies, comprising all the customers of this dairy, and living not only within the district above specified, but in other parts of the parish, 70, or very nearly one-half, were invaded by enteric fever within the ten weeks during which the epidemic lasted. Upon a visit to the farm from which the milk came it was ascertained that a member of the

dairyman's family had been ill with enteric fever, and that the water of the well which supplied the family with drinking water had been polluted by his discharges. Although the dairyman denied that this water had ever been mixed with the milk, he admitted that it had been used to wash the milk pans.

Another remarkable instance of this kind, occurring at Bristol, was studied and described by Davies, the medical officer of health of that city. The location of the cases having indicated that the origi n of the epidemic lay in milk coming from the place, a search was made for the source of contamination of that milk. For a long time no explanation appeared, but it was finally learned that a man working in the fields, on the side of the valley from which this milk was brought, had not been well, though continuing at work. He had frequently evacuations from his bowels in the fields, and his blood gave the Widal reaction on examination. It was ascertained that the milk-cans were washed with water from the stream running through this valley.

In some cases oysters have been shown to be the agents conveying the typhoid bacilli; there are many instances on record. Chantemesse, in 1896, reported a small outbreak of enteic fever due to this cause; and it was in a village where there had been no case of enteric fever for about a year. A merchant there imported a lot of iysters which were eaten raw by fourteen people. All of these were taken sick, while none of those living in the houses where the oysters were consumed, but not partaking of them, were affected . Eight of these fourteen patients had slight gastro-intestinal attacks; four others were ill for about three weeeks with prostration, abdominal pain, tympanitis, tenderness, and dysenteric movements; the remaining two had severe attacks of enteric fever. Foote has shown that typhoid bacilli with which oysters have been intentionally infected may be found in them even after thirty days from the date of infection. Even in extremely cold weather they may live in unsterilised salt water or brackish water for at least eight days. In warm water they rapidly diminish in number after the first week, and cannot be detected in the water aftre three weeks. He also showed that the typhoid bacillus lives longer in the juice and stomach of the oyster than it does in the water in which the oyster grows. Chantemesse experimented by intentionally contaminating oysters by typhoid cultures, thereafter placing them in sea water. On removal at the end of twenty-five hours,

they were found in as virulent a condition as hitherto.

Ice-cream has sometimes been the cause of an epidemic of enteric fever. An outbreak occurring in Mid-Renfrewshire in 1893 was evidently due, at least in part , to the use of ice-cream sold by a dealer whose daughter was sick with typhoid but continued to work in the shop during most of her illness.

Othere articles of food have been blamed for typhoid outbreaks. Several epidemics of the disease have been reported in which the malady appears to have been caused by the use of flesh of diseased animals or of putrefying meat. In some of these the symptoms were rather those of irritant poisoning than of enteric fever, and consisted principally in violent vomiting and purging coming on very shortly after the ingestion of the unwholesome food. As typhoid fever has never been recognised in animals, it is difficult to avoid the suspicion that there may have been some other factor at work in these cases. There yet remains a certain number in which the symptoms cannot thus be explained. One of the most remarkable of these occurred in 1878 at a festival which was held at Kloten, a place about seven miles north of Zurich, of which the following is an epitome; Out of 690 persons who sat down to the collation, 290 were taken ill; 378 other persons, who did not attend the festival, but who partook of the meat provided for it, were also affected. In addition to these, 48 secondary cases occurred -- i.e. of persons who subsequently became affected without having eaten of the meat. All other sources of affection could certainly be excluded, as Kolten was quite free from enteric fever at the time, and it was clealy shown that the water was not the cause of the outbreak. All the visitors at the festival who ate no meat escaped, as did also several persons who drank wine to excess and subsequently vomited. The period of incubation was short, as in other epidemics arising from the same cause. Some of the people were ill in the second day, with loss of appetite, nausea, headache, pain and swelling of the abdomen, and slight fever These cases were slight, and generally ended in recovery. The greater number were affected between the fifth and ninth days. The symptoms in these cases, which usually ran a rapid course, and generally ended in recovery, were chills, fever, diarrhoea, great prsotration, frequently violent delirium, and also profuse intestinal haemorrhage. The roselous eruption was present in almost all of them, and in a few the taches blenâtres (bluish spots in the skin) were detected. At the autopsy the characteristic appearances of enteric fever

were found. With regard to the meat supplied, the following facts were ascertained; Forty-two pounds of veal were furnished by a butcher at Seeback, taken from a calf which appears to have been at the point of death when it was killed by the butcher. All the flesh of the animal was sent to supply the festival at Kolten, but the liver was eaten by an inhabitant of Seebach, and he was attacked by enteric fever. The brain was sent to the parsonage at Seebach, and all the household became affected by the same disease. It was also ascertained another of the calves was diseased. The veal from this calf had been kept fourteen days, and was in a decomposed state. All the meat was placed together in the meat-safe of the inn at which the festival was held. This receptacle was in an exceedingly filthy state, and Cayley (on some points in the Pathology and Treatment of Typhoid Fever, London, 1880) thinks there can be no doubt that the putrefying flesh of this last calfe, together with the state of the meat-receptacle , would rapidly excite decomposition in the whole supply. Geissler dubts whether this epidemic was really enteric fever, and points out that the symptoms occurred too soon after the ingestion of the diseased meat, and reached their full development too rapidly. The cases were also accompanied by more pain in the abdomen than is generally met with in enteric fever. Theproportion of recoveries also appears to have been unusually large. Unquestionably the patients in the Kloten epidemic were in a large nu mber of instances simply suffering from the action of an irritant poison; but the presence of the characteristic lesions of enteric fever in some of the fatal cases renders it certain that this disease existed in the village at the same time. In the report of this epidemic it is not stated that either of the calves which furnished a part of the meat for the festival were suffering from enteric fever at the time they were slaughtered. It is said that this animal is liable to be attacked by the disease and that in certain cases enteric fever has followed the eating of veal (Berl. klin. Woch., No. 39, 1878). That it does not usually occur from this cause is believed to be probably due to the fact that the flesh of such an animal is eaten before it has had time to acquire infective properties.

P A T H O L O G Y

By being swallowed the bacillus typhosus gains entrance to the organs by means of the intestine. For one or two weeks no effects, or but very slight ones, are produced. Sometimes the bacilli may remain alive in one or other part of the body for a long period giving rise to unimportant symptoms. Usually, however, in one or two weeks after their introduction decided effects begin gradually to show themselves. The typhoid bacilli have been found in nearly every organ and tissue and fluid of the body in which they have been looked for, they escape with the urine and faeces, and may also make their way through the placenta into the foetus. Lodging in these various parts and scattering everywhere their poisonous products, they give rise to abnormal phenomena which may be divided into two groups - intoxication, and anatomical lesions. In the majority of ordinary cases of enteric fever the toxic effects decidedly predominate; the local lesions and the symptoms depending directly upon these lesions play in most cases a less conspicuous part. Among the prominent toxic effects of the disease are the elevation of temperature, characteristic in its duration and its variations, the prostration, the general pains, and the disturbances of the nervous system. The disturbance of the circulation, and probably also the distension of the abdomen, are in part effects of the intoxication. The typhoid bacilli and their products not only intefere with the functions of the organs by their poisonous action, but even cause structural changes in them. The tissues are excited to somewhat characteristic histological changes. The small lymph channels, more particularly in and around nodules of lymphoid tissues, are especially sensitive to the infection, and react principally in the way of cellular proliferation. This, with some congestion and inflammatory exudation, produces a marked swelling of the lymph organs, and frequently ends in such an obstruction to the local circulation that necrosis results, and a sloughing of exposed surfaces In ther cases or in other parts of the same patient the bacilli may have a true pyogenic power, causing suppurative inflammation in various organs and tissues. Degenerations of various kinds are also commonly produced in different organs, especially in the protoplasm of the cell bodies, as in the case of many infectious diseases. The typhoid

The typhoid bacilli appear to have a marked preference for certain parts of the body - viz; the lymphoid structures of the lower end of the ileum, the mesenteric lymph nodes, and the spleen, and then the mucous membranes of the rest of the ileum, the large intestine, the jejunum , the larynx, the pharynx, the gall-bladder, and the bones. The blood-vessels and the liver are less frequently affected. The most noticeable lesions found in enteric fever are those of Peyer's patches. They become enlarged and congested, necrotic, ulcerated, and later cicatrised. The other mucous membranes above mentioned may show similar changes.
The lymph nodes and spleen become enlarged , and the bones and their periosteum may be inflamed.
Some of the blood-vessels are occluded by the proliferated endothelium or by clots caused by these cells as they break down, and these obstructions lead to necrosis, as seen in minute foci in the liver, ulcers of various size in the mucous membrane and gangrene in various situations. The debility and malnutrition induced by all these effects of the infection, aided by the pressure on certain parts, may cause bed-sores. These bed-sores, gangrenous areas, and ulcers, furnish a ready means of entrance for pyogenic micro-organisms causing a mixed infection with the usual pyaemic manifestations.

M O R B I D A N A T O M Y.

Appearance of the cadaver.

Usually rigor mortis is more marked and more prolonged than after typhus. Emaciation is often extreme in cases in which death has taken place after the third week, especially if they have been attended by much diarrhoea, and fever. No traces of the characteristic roseolous eruption are found after death , no matter how profuse it may have been during life. Sudamina, on the other hand, persist, and discolorations of the dependent parts of the body are invariably observed.

NATURE OF THE LESIONS.

Enteric fever differs from the other continued fevers, with the exception of cerebro-spinal fever, in the invariable presence of special pathological changes. These are so characteristic that an examination of the body after

death will in all cases make known the nature of the disease no matter whether the symptoms have been suggestive or nor during life. It must be remembered, however, that the intestinal lesion s, and those of the mesenteric glands, do not constitute the disease, but that the chemical poison produced by its specific cause is taken up by the fluids of the body and gives rise to general disturbances, which are present in all fully developed cases, which manifest themselves at a very early period in the attack. The more important symptoms of the malady are not due to the special lesions. but can be directly attributed to the general process.

The anatomical lesions of enteric fever can, therefore be divided into two groups. The fist of these includes certain changes in the glands of Peyer, the solitary glands of the intestines, the spleen, and other lymphatic structures of the body. These changes, which consist essentially in a medullary infiltration of these glands, will be minutely described presently. They are peculiar to the disease, and just as characteristic of it as the condition of the lungs and their membranes found in pneumonia and pleurisy are characteristic of those diseases. They are usually most developed in grave cases, but occasionally they are slight and but little marked in cases in which the general symptoms were severe. They, therefore, cannot be regardedas the sole cause of the latter. It is more probable that they are themselves the result of the local action of the typhoid poison, and bear somewhat of the same relation to enteric fever that the eruption in small-pox does to that disease. The second group is made up of lesions which are met with not only in this disease, but in other diseases accompanied by high fever, and are, therefore, unquestionably the result of the general process resulting from the action of the various toxic principles to which thephenomena of such diseases are due. These anatomical changes - essentially those of parenchymatous degernations of various organs and tissues - attain their fullest development in enteric fever, however, for reason that in this disease the organism is continuously subjected to the action of those toxic principles for a considerable length of time.

THE INTESTINES.

The most remarkable changes in enteric fever, and those which have formed the basis for its satisfactory recognition as a distinct morbid entity, are those of the lymphoid structures in the lower part of the small intestine. Peyer's

patches and the solitary glands of this region, in almost every case of typhoid infection, undergo characteristic changes, as was first fully demonstrated by Bretonneau. These had been usually described as passing through four stages, as follows; (1) the stage of medullary infiltration; (2) the stage of softening or sloughing; (3) the stage of ulceration; (4) thestage of cicatrisation. These stages are said to last about a week, and correspond to certain definite periods of the disease, but it is not uncommon to find inthe same intestine glands in two or more of these stages . Indeed, the same gland may sometimes be found ulcerating at one side and undergoing at the other the cicatricial process.

FIRST-STAGE - MEDULLARY INFILTRATION.

In this stage the agminated glands are enlarged, each Peyer's patch preserving its oblong shape, and being flattened on the surface and elevated from half a line to two lines above the surrounding mucous membrane, from which it is separated by an abrupt border, and which it may in a few cases overhang like a fungous growth. The solitary follicles are also swollen, and may vary in size from a hempseed to a split pea. In very severe cases all the glands may be more or less involved, but in mild cases the changesmay be limited to three or fourof Peyer's patches, although the solitary glands rarely wholely escape. It is uncommon also for the latter to be alone affected, but a few such cases have been reported. In these the mucous membrane appears to be studded with pustules, and hence Cruveilhler designated this variety as the "forme pustulense." The mucous membrane covering the affected glands is reddish-green in colour, and that in their immediate vicinity, is often injected. The changes above described occur early in the disease - Murchison has seen them in two cases in which death took place at the end of the first day - and they are often well marked at the end of the third or fourth day. They are usually limited to the glands in the lower part of the ileum, the agminated glands being often found perfectly healthy four feet above the ileo-caecal valve. So, too, the changesin the solitary glands may be confined to the last twelve inches of the smaller intestine, but this is by no means universally the case, for these glands are not only often found enlarged higher up in the small intestine, but also occasionally in the caecum. The agminated glands are sometimes found enlarged in the bodies of those who have died of measles , but the degree of enlargement is rarely as great as in enteric fever, and further

changes to be described are never found except in the latter disease. Under the microscope the medullary infiltration upon which the enlargement of the glands depends is found to be due to proliferation of the cellular elements. In the case of the agminated glands this proliferation may be limited to the follicles or it may extend to the intercullular tissue, and even to the adjacent mucous membrane. In the former case the patches have a reticulated appearance; they are soft and but little elevated. These are the "plaques molles" of Louis and the "plaques reticulées" of Chomel. In the latter they are harder, smoother, and more elevated. To this variety Louis has given the name of "plaques dures", Chomel that of "plaques ganffrées". The morbid process is also very apt to extend from the solitary follicles to the surrounding mucous membrane. In a large number of the glands in many cases, and probably in all of them in the abortive form of the disease, the changes never advance beyond the first stage, a restoration to their normal condition taking place, according to Rindfleisch (Pathological Histology, Sydenham Society Translation, vol. i, p. 441.), by colliquative softening. The morbid material upon which their enlargement depends breaks down into an oily débris which is gradually absorbed. This retrograde process takes place faster in the follicles than in the intefollicular tissue, and, as pigment is very apt to be deposited in the depression thus formed, the patches acquire an appearance which has been compared to that of a recently shaved beard. This appearance, however, is not peculiar to enteric fever as it is met with in other diseases.

SECOND-STAGE- SOFTENING OR SLOUGHING. In this stage of necrosis small portions of single Pyerian patches, varying insize from that of a lentil to from three-quarters of an inch to an inch and a quarter in diameter, assume a yellowish-white, opaque tint instead of their former reddish and translucent appearance, gradually become separated from the surrounding tissue by a sharp line of demarcation, and then pass into a state of cheesy necrosis. Here and there the same changes are observed to have taken place in the solitary glands. When once this has occurred, recovery can only take place by expulsion of the necrosed parts and consequent ulceration. Necrosis of the glands probably rarely occurs before the beginning of the second week, but it has occasionally been observed much earlier. Murchison reports a case in which he saw it as early as the first and second days. The

process may extend to the muscular and even to the peritoneal coats, bit it usually involves the mucous membrane only.

THIRD STAGE - ULCERATION.

The dead parts are now gradually thrown off, the process of separation usually lasting several days. At first an increased degree of congestion, followed by suppuration, is observed at the edges of the sloughs, which before their complete detachment may often acquire a yellow, green, or brown colour from the imbibition of bile. The ulcers which result correspond in size and form with the sloughs. They are, therefore, in the case of agminated glands elliptical in shape, with their long diameter corresponding to the axis of the intestine. Their edges are swollen and overhanging, and their floor is generally formed by the deepest layer of submucous connective tissue. They sometimes penetrate much more deeply , and may even extend to the peritoneal coat, and thus give rise to perforation of the bowel. The ulcers which result from sloughing of the solitary glands are, as a rule, small and round. Ulceration may also be formed as follows; The mucous membrane becomes softened, and one or more superficial abrasions appear on the surface of the diseased patch, which extend and unite into one large ulcer, and this ulcer proceeds to various depths through the coats of the bowel, and even to completed perforation.

FOURTH STAGE - CICATRISATION.

This usually commences with the beginning of the fourth week. The swelling of the edges of the ulcers gradually diminishes, and they become adherent to the tissues beneath. The floor of the ulcers itself with delicate granulations, which in course of time are converted into connective tissue. This is ultimately coated with epitheluim, but neither the villi nor the glands of the mucous membrane are ver reproduced. The resulting cicatrices may be recognised by the affected parts of the bowel being thin and more translucent than in health, and may retain these characters after the lapse of severl years. They never give rise to contraction of the bowel. The time occupied in the cicatrisation of each ulcer is said to be about two weeks. It occasionally happens that white cicatrisation is taking place at one end of the ulcer the process of necrosis and ulceration is still going on at the other, so that two or more

ulcers may occasionally run together. The form of the ulcer may often retard recovery, and may sometimes end in perforation of the intestine, even after the patient has apparently recovered from his his illness.

In many cases the mucous membrane of the caecum and colon is of normal colour and consistence. In a few the membrane is paler than in health, and in others it is of an ash-grey colour. It is also sometimes injected and softened. The solitary glands are frequently enlarged and ulcerated, like those of the ileum. In the former case the mucous membranes of the large intestine throughout the whole extent, but especially that of the caecum and of the part of the colon adjacent to it, is studded with minute elevations about a line in diameter. When ulceration has occurred the ulcers are generally round and small, but they may occasionally be oval and of considerable size. In the latter case their long diameter will correspond in direction with that of the circular fibres of the intestine. They have been known sometimes to be quite an inch and a half long. Flatus usually fills the colon.

THE MESENTERIC LYMPH NODES.

The morbid changes of the intestines above described are constantly associated with enlargement of the mesenteric glands from cellular hyperplasia and hypertrophy of the connective tissue. This enlargement varies in different cases. In some the glands are not larger than a pea or bean; in others they may reach the size of a hen's egg. It is always more marked in the glands which lie in the angle between the lower end of the ileum and the caecum , and usually bears some proportion to the intensity of the local disease; but is not to be regarded merely as a result of thelocal irritation, as it has been observed in parts of the mesentery corresponding to perfectly healthy portions of the intestine, and as the mesocolic glands have been involved in cases in which the colon was free from disease. It has, moreover, been observed in cases in which death has occurred very early in the disease, and there can, therefore, be little doubt that it is as much the result of the infe ctive process as the infiltration of Peyer's patches. In addition to being enlarged, if death has taken place before the end of the second week the glands are hyperaemic and of a purplish colour. Later than this, when the sloughs have become detached from Peyer's patches, the swelling of the glands diminishes,; they lose their colour and become pale, and if convalescence ensues they return finally to their former healthy condition.

Still they have beens een shrivelled and pale or bluish for some time after convalescence. In other cases the substance of the glands softens, with the formation of a puriform liquid. If the softening only involves a small part of the glandular structure, restoration to health may take place, through the absorption of this liquid. If it is more extensive, the whole of the glands may break down with the puriform liquid, which, when the patient recovers, undergoes caseous and finally calcareous degeneration. Occasionally a gland ruptures and its contents escape into the peritoneal cavity causing death.

THE LIVER

The presence of minute spots necrosis and inflammation in this organ constitutes a prominent effect of the typhoid bacilli in the system. These spots were at first spoken of as lymphoid nodules and compared to the lymphoid hyperplasia in the intestines, mesenteric glands, and spleen. In 1859, Friedrich first called attention to these nodules and they were finally described by Wagner a year later. Hoffmann found them in 38 out of 250 cases, but they are probably more frequent than this. Some of these spots lie between the lobules, and consist of an increase of lymphoid and plasma cells with a proliferation of endothelial cells forming large phagocytic cells. Others lie within the lobules and show similar cells and, in addition, necrosis of these and of the liver cells. These changes have been found in other infectious diseases. The nodules are so small that few of them can be distinguished by the naked eye. There is also considerable parenchymatous degeneration of the hepatic cells, varying in degree with the stage and severity of the attack. The cells are at first filled with albuminous granules, later with fatty granules and coarse fat drops, and they may ultimately break down. The periphery of the lobule is usually more affected by these degenerative changes than the centre. In its gross appearance the organ is often reported intact, often so slightly changed, and often as showing distinct lesions. At first it is apt to be hyper aemic and slightly enlarged; later it becomes somewhat flabby and pale; as the result of the parenchymatous degeneration the lobular makings become less distinct . In severe and protracted cases the degeneration may reach so high a degree that the organ becomes small, flabby and of a grayish colour. Pyaemic deposits, embolism and abscess are rarer lesions.

THE SPLEEN

The lesions in the spleen are analagous to those which take place in the lympthatic follicles of the intestine and in the mesenteric glands. It is almost invariably found increased in volume and to have undergone changes in consistence and colour. The degree of enlargement and other changes vary, of course, with the stage of the disease at which death has occurred. The enlargement occurs with less frequency in elderly than in young people, and is most marked at the height of the disease, the organ being often more than twice or three times its normal size, and in some cases, it is said, even larger. Later and especially during convalescence, the enlargement has generally very much diminished. During the first ten days of the disease the spleen is generally tense and firm, engorged with blood, and dark red in colour. Between the tenth ad thirtieth days its appearance remains the same, but the organ is found to be soft and friable. During convalescence it becomes paler and firmer again, and is often so shrunken in size that its capsule is relaxed and wrinkled. Haemorrhagic infarctions are often met with. These sometimes soften and break down into a puriform liquid, which may sometimes cause peritonitis by rupture into the peritoneal cavity. Rupture of the spleen has also sometimes occurred from mechanical violence. These changes are due in part to variations in the amount of blood, and in part to a medullary infiltration of the Malpighian corpuscles similar to that which takes place in the mesenteric and intestinal lymphoid structures.

OTHER GLANDS.

The glands in the fissure of the liver, the gastric, lumbar, inguinal glands, and indeed all the lymphatic glands in the body, have occasionally been found swollen and congested, but their enlargement cannot be classed among the specific lesions of the disease, but is merely the result of a local irritation. Thus Jenner says that in the case of an extensive ulceration of the oesophagus which came under his observation there was marked enlargement of the oesophageal glands. The lymphatic follicles which surround the glands at the root of the tongue and in the tonsils are often affected in the same way as the glands. In most cases after a time the swelling disappears, but sometimes softening and rupture occur. Analogous changes have also been observed in the salivary glands and pancreas, except that ,

according to Hoffmann, a cellular proliferation proceeds the degeneration process. Changes in the Thyroid are rare. Carxhmann found in 347 autopsies no case of thyroiditis, and in a large epidemic he found only 2 cases clinically. Topfer found 3 abscesses in 927 autopsies. Griessenger found inflammation of the thyroid 4 times in 118 autopsies. Walther found that in 73 cases of acute thyroiditis 40 were referable to enteric fever. The bacillus typhosus have been found only a very few times in the thyroid gland. In several other cases the pyogenic organisms have been demonstrated. ~~Thyroid~~ Thyroiditis is more apt tooccur at the beginning of convalescence or during the last week of the fever, especially where there has been a hyperplasia of the gland. It is, therefore, common in goitrous districts. Usually only a small part or a half of the organ is affected. Such cases usually recover satisfactorily. Compression, dislocation, or perforation of the trachea occasionally occur.

P H A R Y N X A N D O E S O P H A G U S

The mucous membrane of these parts may present a perfectly healthy appearance but occasionally it is congested and the seat of ulcerations which are for the most part superficial. Sometimes, however, they have been found to extend to the muscular coat, but they have never been known to penetrate all the coats of these organs. Jenner mentions one case in which there was extensive ulceration of the oesophagus, but usually the number of ulcers is not large. Murchison in a few cases found the pharyngeal mucous membrane coated by a membrane exudate and the submucous tissues ~~of~~ infiltrated with serum and pus. Osler and Packard refer each to a case, presenting oesohpageal stricture, probably due to contraction of the typhoid ulcers consequent upon their cicatrisation.

STOMACH AND SMALL INTESTINES.

The stomach and upper part of the intestinal tract present no lesions which are at all peculiar to enteric fever. In a ~~xxxxxx~~ certain number of cases congestion , softening, and even superficial ulceration, of the mucous membrane of the stomach, and less frequently that of the duodenum, have been found, Fenwick reports death due to severe haemorrhage from a typhoid ulcer of the stomach. The mucous membrane of the jejunum and upper part of the ileum is not usually much reddened, and may be even

paler than in health. In cases which have been protracted it may be of an ash-gray, or slate colour. The contents of this part of the intestinal tract, which is rarely much distended by flatus, do not differ materially in appearance or consistence from the matter which generally composes the typhoid stool. The bowels may, of course, be found filled with blood in cases in which a recent haemorrhage has taken place. Invaginations of the small intestines, unaccompanied by any evidence of inflammation, are occasionally met with in the bodies of those who have died of enteric fever. They are produced probably during the death agony, and as they occur in many other diseases, they cannot be regarded as peculiar to this disease.

THE GALL-BLADDER.

The mucous membrane of this viscus has often been found to be the seat of ulcers. It occasionally presents the evidences of catarrhal or membraneous inflammation. The gall-bladder usually contains a pale watery liquid of a less density than bile. Its contents, are, however, mixed with pus and shreds of false membrane which inflammation of its lining membrane has existed. The gall-bladder appears to be one of the favourite haunts of the typhoid bacilli. Gilbert and Girode found them there frequently, and Chiari believes, from a large experience, that they are usually present here in cases of enteric fever. He examined the organ in 22 consecutive autopsies or patients who had died of this disease, and was able to demonstrate the fact in 20 of the cases. Birch-Hirschfield has had similar results. Richardson reports that a bacteriological examination of the contents of the gall-bladder was made in 3 autopsies of typhoid patients and that the specific bacilli were found in every case. Various observers have made cultures from the contents obtained during life on the occasion of surgical operations upon the gall-bladder, with the result that the typhoid bacilli were demonstrated in a number of cases, including some in which many months, or even years, had passed since the attack of enteric fever. As Councilman has suggested, it is reasonable to suppose that the bacilli found their way to the gall-bladder through the liver. We know that they circulate with the blood, and the liver being commonly the seat of numerous necrotic spots, there is no easy way of escape for the bacilli from the blood-vessels into the bile ducts. As we know they can escape from the blood-vessels of the kidney into the urine, it

it is easy to believe that they might more readily escape through thse necrotic areas into the liver into the gall-bladder. The bacilli are undoubtedly the principal cause of the ulcerations in the walls of the gall-bladder and the larger bile-ducts, though other conditions, such as the presence of calculi, are undoubtedly contributing factors. It has been suggested that the typhoid bacilli may have some influence on the production of gall-stones, but the facts already collected are not sufficient for us to form a conclusive opinion in regard to this. The gall-bladder perhaps forms a sort of base of operations from which the bacilli may from time to time make excursions and produce reinfection. The occurrence of ulcerative and membranous inflammations of the wall of the gall-bladder has long been known to occur.

T H E L A R Y N X.

The laryngeal mucous membrane is sometimes found to have been the seat of catarrhal or diphtheritic inflammation, and sometimes also of ulceration. Jenner says that in enteric fever laryngitis independent of pharyngitis is extremely rare, but the German writers express a different opinion. Griesinger estimated that laryngeal ulcers were present in one-fifth of the fatal cases. Hoffmann found them twenty-eight times in two hundred and fifty autopsies, and that the ulcers extended to an d involved the cartilages in twenty-two out of twenty-eight cases. They are most commonly found in the posterior wall of the larynx and may involve the vocal cords. They are often discovered after death in cases in which their existence was not suspected during life. They were formerly supposed to be the result of typhoid infiltration of the laryngeal glands, but careful investigation has shown that they are the consequence of membranous laryngitis. Inflammation and ulceration of the trachea are comparatively rare.

T H E L U N G S.

These organs almost constantly present changes referable to the enfeeblement of the circulation and the blunted condition of the nervous system. Hypostasis is very frequent; it is limited to the more dependent portions of the lungs. More or less extensive lobular pheumonia of the nature of the so-called inhalation pneumonia is often present. Pulmary oedema is common, The bronchitis sometimes takes on a putrid character,

and the lobular infiltrations may, in severe cases, be transformed into genuine gangrene. Lobar pneumonia also occurs, but only as a complication, but in certain instances at the onset of the disease, under circumstances which render it probable that it is a prominent early localisation. For this reason, the term "pneumo-typhoid" has been applied to the group of cases thus characterised. Acute miliary tuberculosis is le ss often a complication than a sequel of the attack.

NERVOUS SYSTEM.

Enteric fever produces few and unimportant changes in the brain and its membranes, even in cases attended by severe nervous symptoms. These most frequently found are adhesions of the dura mater to the inner surface of the cranium, injection or oedema of the pia water, congestive oedema, and sometimes softening of the brain and effusions at its base. The microscopic changes do not appear to have been carefully studied. It is said that the gray substance of the cortical portion of the brain and of the interior is sometimes of a yellowish brown colour, and that diffuse yellow and blackish brown spots in different places, especially in the corpus striatum and optic thalmus, may be observed. In such places the microscope shows a diffuse yellow colour, a deposit of small brown pigment-granules, and also, especially in the optic thalamus and corpus striatum, the ganglion - cells thickly crowded with brownish or blackish pigment granules in such numbers as to conceal the outlines of many of the cells. These changes Hoffmann, who has specially studied them, is inclined to place by the side of the parenchymatous degeneration of other organs. Virchow found also an unusual amount of pigment in the ganglion-cells of the sympathetic system.

THE MUSCLES.

The muscles often show marked changes in enteric fever. The ir macroscopic appearance vary with the stage of the disease at which they are examined. When death takes place in the first or second week they are usually dark red or reddish-brown in colour, and very dry. If it is delayed until later, they present a peculiar fawn or yellow tint permeating the ordinary red in patches and veins not unlike the appearance of veined marble. Their consistence is also so much diminished that the finger may readily be ~~pkxx~~ passed through them. Occasionally, abscesses and haemorrhages into the muscular sheath are found,

and Dauvé and Ball (L'Union Méd., 1866) report cases in which, in addition to these changes, rupture of muscles has occurred. Zeuker, who was the first to call attention to them, ranged the changes seen under the microscopic under two heads; (1) granular or fatty degeneration; (2) waxy degeneration. In the first variety the transverse strial disappear and the sarcolemma appears filled with fine granular matter. In the second variety the striated muscles become, as it were, pervaded by a coagulating material which sets, and in contracting breaks up the fibres into great numbers of short waxy-looking lumps, not unlike a certain variety of casts of the straight tubules of the kidneys. When recovery takes place the affected fibre appears to be regenerated by a cell-growth within the sarcolemma. These changes occur in most fevers, as typhus, small-pox, scarlatina, and are regarded as being due to the hyperpyrexia which is a frequent accompaniement of these diseases. Hayem, however, asserts that he has found them well marked in cases not characterised by a high temperature and that, on the other hand, they are sometimes absent in cases where this has been present. The waxy form of degeneration may affect all the striped muscles, but it is oftenest seen in the muscles of the tongue, the diaphragm, the abdominal wall, and the adductors of the thigh.

THE HEART.

In common with the other muscles of the body, the heart suffers from both the forms of degeneration, above described, but the granular form appears to be more common than the waxy. In protracted cases it is usually much softened, and when thrown upon a plate no longer retains its form. It has usually lost its normal colour and acquired the tint described by French authors as "feuille morte", from its resemblance to that of a faded leaf. Upon minute examination the degeneration is found to have taken place in patches, the diseased fibres being found alongside of others, which have scarcely undergone any alteration. These patches are especially common in the papillary muscles of the mitral-valve - a fact which explains the occasional presence of systolic murmurs in enteric fever. In addition to the microscopical appearances of the muscles already described, Hayem (Leçons cliniques sur les Manifestations cardiaques de la Fievre typhoide, Paris, 1875) has observed in his examinations of the heart a cellular infiltration of the connective tissue and a proliferation of the muscle nuclei. These

changes are sufficient in his opinion to establish the existence of myocarditis. He further mentions having found evidences of the frequent occurrence of endarteritis in the multiplication of the cellular elements of the internal coat of the small arteries.

BLOOD VESSELS.

Any part of the circulartory system may be attacked with especial virulence by the typhoid infection. The changes often observed in the large blood-vessels, especially the veins, are probably due to similar processes as in the case of the lymphatic. The proliferation of cells in and beneath the endothelium and their subsequent degeneration with the consequent formation of fibrinous thrombi affords an explanation of the thromboses which occur so frequently in the veins of typhoid patients and often in the arteries. In addition we have the feebleness of the circulation due to the general prostration and degenerative changes in the heart, and there may be other and deleterious agents working in the same direction where, as so frequently occurs late in enteric fever, there is a secondary infection with pyogenic micro-organisms. Thrombosis of the large veins of the leg with the well-known symptoms of phlegmasia alba dolens is a common occurrence during the later stages of enteric fever, and especially during convalescence . It sometimes comes on with an exacerbation of fever, with considerable pain in the region of the crural and itiac veins, and with redness and tenderness along these veins, from which it follows that it is not always a simple thrombosis, but depends upon, or at least is associated with, an imflammatory condition of the venous wall. The presence of Eberth's bacillus in typhoid phlebitis has not been satisfactorily established as a regular occurrence. Pyogenic cocci have been observed. This accident occurs commonly during convalescence. As is the case in other infectious diseases, such as puerperal fever, pneumonia, septicaemia, pyaemia, tuberculosis, and malarial fever, venous thrombosis occurs most frequently in the lower extremities, and more frequently in the left leg than in the right. Next to the pulmonary and saphenous veins the popliteal and tibeal veins follow in frequency. Phlebitis and periphlebitis have been seen in typhoid cases in old varicose dilatations of the crural veins. It is occasionally seen also in other parts of the body, as in the

subclavian and axillary veins. The thrombosis may extend from the pulmonary vein into the iliac and vena cava, and even into the right artery. Death follows in the latter case, and may be caused by embolism of one of the main pulmonary arteries or of one of the cerebral arteries. Venous thrombosis may also have some influence in producing gangrene of various superficial parts, but it is much more commonly produced by arterial changes. This venous complication is often distressing to the patient, and usually greatly prolongs convalescence and may impair the usefulness of the limbs for a long time, but usually ends in recovery without serious consequences. The arteries are much less frequently affected than the veins, but ther affection is more apt to lead to serious consequences, especially gangrene. Typhoid gangrene is most frequently seen in the lower extremities, and usually on one side only. It may be confined to the toes or may involve large parts of the limbs. In the upper limbs the lesion is extremely rare, though it is sometimes seen there, and may involve other superficial parts, as about the neck, mouth, and the genitals. The female genitals are more apt to suffer than the male and there may be extensive destruction of tissue, opening the urethra, the bladder, or the rectum, or lighting up a peritonitis.

THE BLOOD.

The red blood-corpuscles show a gradual decrease in number during the course of the fever, and may present the alterations commonly found in secondary anaemias; the haemoglobin falls at the same time, but to a greater extent, and reaches the normal more slowly. The degree of anaemia is in general proportional to the severity of the case, and may endanger life. The most striking feature of the blood is the absence of any increase in the number of lencoytes. Exceptions are extremely rare save in the case of complications, and the number is often considerably diminished. Complicated cases may show an increase in the number of lencoytes. Cabot refers to the following cases; One in which a perforation raised the number from 8.300 to 24.000, another case of perforation in which the number at the time of perforation was 18.500; a case of phlebitis in which the number was raised from 6.400 to 12.900, falling in one week later to 10.100, another case of phlebitis in which the number rose from 4.800 to 6.200; a case of mastoid abscess in which the number rose from 5.300 to 16.400; a case

of otitis media in which the number rose from 7.200 to 14.000; a case of abscess of the buttock in which the number rose from 8.000 to 11.200; and a case of haemorrgagein which the number rose from 8.000 to 11.300. Cabot says that general bronchitis has usually no effect in augmenting the lencocyte count unless this disease invades the smallest tubes, and cystitis also had no effect in two cases, and he is of the opinion that the complications directly due to the bacillus typhosus, such as cystitis or pneumonia, do not raise the number of lencocytes. In case of great exhaustion a complication may fail to produce any leucocytosis, and, on the other hand, lencocytosis , is occasionally seen where it is impossible to make out the presence of any complication. In such cases, however, the possibility of a secondary infection , an osteomyelitis or a phlebitis of internal veins cannot be possibly excluded. The polymorpho- nuclear lencocytes gradually diminish - in the latter part of the illness perhaps falling below 50 per cent. -- and the lymphocytes increase in number. Eberth's bacilli, have been found by culture in the blood, but usually only in a few of the severe cases. Missul reports that he found them in each of nine cases examined. Külnau, using from 5 to 10 c.c. of blood for each culture, found ~~in~~ the organism in ten out of forty-one cases. Almquist and Silvestrini found them only occasionally . Bloch obtained them in one out of seven cases. Fraenkel, Simmonds, Lugatello, Seitz and Gaffky failed in their attempts to isolate them from the blood. According to Cabot, with the exception of Kühmau, other observers have been successful in only seven cases out of one hundred and seventy-six cases examined. Neuhans and Ruetmeyer claim to have found the bacilli in blood obtained by puncturing the rose spots, Neuhans in nine cases out of fifteen; but Fraenkel, Simmonds, Seitz, Lugatello, Gaffky, Janowski, and Chrschmann obtained negative results. From blood ~~xxxx~~ taken during life from the spleen, Chantemesse and Widal and many others have succeeded in obtaining growths of the bacilli, though some other investigators have failed. The bacilli have been found in a large number in the contents of the thoracic duct, giving rise to the suggestion that this is the principal channel by which they find their way from the intestines into the blood . Having once entered the blood, however, they are carried to the various organs and tissues of the body, and escape into the urine through the kidneys, and into the lumen of the intestine by the breaking down of the lymphoid structures in its wall. In

the latter part of enteric fever especially , the blood occasionally contains pyogenic micro-organisms.

THE KIDNEYS.

The kidneys are sometimes pale and flabby, sometimes engorged with blood. Under the microscope the appearances are similar to those described as occurring in the liver, and it is therefore unnecessary to refer to them more fully here. As a rule the epithelium becomes granular earlier and to a marked degree in the cortical than in the tubular portion. The absence of albuminuria must not always be accepted as proof of a healthy condition of the kidneys, as this symptom has been wholly wanting in cases in which the organs have been the seat of disease. Changes in the rest of the urinary tract are less common, though pyelitis and cystitis occasionally occur. In some of these cases typhoid bacilli have been found in the urine. Inflammation of these parts may be suppurative or diphtheritic, and suppuration and perforation of the bladder have also been known to occur under these circumstances.

THE EARS.

These may become affected by an extension of pharyngeal catarrh up the Eustachian tubes. The tympanic cavity may, therefore, be the seat of inflammation, which may be catarrhal, suppurative, or diphtheritic. Otitis media was found by Hengst in 28 out of 1.228 cases. Bezold found a disturbance of hearing in 50 out of 1.243 cases. Buerkner attributed 1'8 per cent. of all cases of deafness to enteric fever; Kramer, 2'5 per cent., and Zaufal , 0'7 per cent. Aural complications occur most commonly in the second or fourth week of enteric fever. The bacteria producing them are generally pyogenic, but in a few cases the bacillus typhosus has been found. Suppurative otitis media may go on to perforation of the tympanic membrane, or to suppuration of the mastoid cells and the adjacent structures, or of neighbouring parts.

BONES AND JOINTS .

The typhoid bacilli have been frequently found in great numbers in the medulla of the bones of and in the inflammatory products of their lesions. They have been found lurking here for many years after the febrile attack, associated with more or less interrupted symptoms of trouble in and about the bones. Ponfick

and Mallory found changes in the medulla which closely resembled the characteristic typhoid lesions in lymphoid structures of the intestines, mesentery, and spleen. The lesions are most commonly periostitis with resulting necrosis or abscess. They have been classified by Keen as follows; necrosis in 85 cases, caries in 13, periostitis in 110, ostitis in 12, osteomyelitis in 10, exostosis in 1, granuloma in 12, uncertain in 4. In some case the the trouble is not extensive and subsides without any permanent injury. Besides abscesses and necrosis of the bones perforation into a joint may occur. The osseous complications usually appear late in the disease and often have appeared long after convalescence had been apparently established. The long bones, especially the femur and tibia, are most frequently attacked, occasionally the ribs and sternum. It is especially apt to attack young people near the age of puberty. There may be one spot of such trouble, or it may be scattered in various parts of the body. In young children it ~~is~~ more often begins in the region of the epiphysis. The evidence so far collected strangely points to the view that suppuration in the bone is usually due to the typhoid bacillus, but there are cases of mixed infection. These inflammations occasionally occur at the site of old lesions, and cases have been observed in which long after the attack of enteric fever a periosteal inflammation was set up as an immediate result of injury. In some cases the typhoid bacilli have been cultivated, and it seems probable that the bodies of those convalescent from enteric fever may for a considerable time contain foci of the bacilli which may never produce further trouble or after some injury may start up an inflammation, Typhoid affections of the joints may be of three kinds; proper typhoid, rheumatic, and septic; Typhoid arthritis proper may be limited to one joint or may affect several. The lower extremities are more frequently involved than the upper, and especially the hip-joint . Suppuration rarely follows. The joint may undergo spontaneous dislocation.

S Y M P T O M A T O L O G Y.

C L I N I C A L H I S T O R Y.

I N C U B A T I O N.

The conditions under which enteric fever occurs in large cities render it difficult , if not impossible, to arrive at a definite conclusion as to its period of incubation. Occasionally , however, the time which has intervened between the exposure to the cause and the invasion of the disease may be ascertained with precision in the outbreaks which occur in small towns or in isolated country-houses. Under these circumstances it has been found to vary within very wide limits. In the three cases related by Griesinger the attack began the day after exposure to the infection, and in the outbreak at the school at Clapham referred to by Murchison, twenty out of twenty-two boys were seized with the disease within four days of exposure to infection. Other instances of a similar character are on record. In cases like the above the rapidity with which the attack follows upon exposure to the cause is no doubt due to the intensity of the poison - a view which is to a certain extent supported by the fact that the invasion of the disease under these circumstancesis very apt to be abrupt; the attack being often ushered in with vomiting, and purgeing or with grave cerebral symptoms. Sometimes, indeed, the gastro-intestinal symptoms have been so violent as to have given rise to suspicions of poisoning. In the majority of cases, however, the period of incubation, is probably very much longer than in those above referred to. In the celebrated epidemic which occurred in 1872 at Lausen in Switzerland (Cayley; Brit. Med. Jour., Mar, 15, 1880) the first ten patients were attacked within three weeks of the time when the contamination of the spring which supplied the village must have taken place, and these ten cases were followed in the course of nine days of fifty-seven others. In the town of Over Darwen 1500 persons were seized with enteric fever within three weeks after a patient suffering from this disease was brought to a particular house, the sewage of which was allowed to soak into the ground through which the water-supply pipes of the town passed, and at a point where

they were leaky. Lothholz observed in an epidemic which occurred in the neighbourhood of Jena that the average period of incubation was three weeks, the shortest period eighteen days, the longest twenty-eight days. Haegler found in three cases produced by contaminated water a period of at least three weeks. There are , however, epidemics in record in which the period of incubation was under two weeks as, for instance, that of Basle, in which a few persons were attacked who had only been in the city from seven to fourteen days. Cayley refers to localised outbreaks of the disease, as those of Calne and Nunney, in which persons were attacked within fourteen days of their exposure to the cause Muller (Neue Beit. zur Actiol. des Unterleibs - Typhus, Posen, 1878) of Posen says that the average period of incubation of the disease is fourteen days; that it may not be more than ten days, or, on the other hand, as long as from three to four weeks; and that he has known a case in which it was thirty-four days. Burchison believed that it was commonly about two weeks, and Budd found it to vary from ten to fourteen days in a very large number of cases carefully observed. From this review of the opinions of various authors the conclusion would seem to be justifiable that the period of incubation in enteric fever is usually between two and three weeks, but that in many cases it does not exceed ten days, and in rare instances has unquestionably been very much less. On the other hand, there are authentic cases on record in which it is said to have reached, or ecen exceeded twenty-eight days.

D E V E L O P M E N T A N D P R O G R E S S.

The invasion of enteric fever is usually so gradual that it is often impossible to obtain exact information from patients as to the time of the beginning of their illness. The patient feels languid and disinclined to mental exertion. He has headache and pains in the back and legs and a general sense of weariness. His appetite is impaired and his sleep restless or disturbed by dreams. There may be nausea or even vomiting, and either diarrhoea or constipation may be present. There is seldom a decided chill, but the patient may complain of sensations of chilliness or slight feverishness . These slight symptoms are usually classed as prodromes and assigned to the stage of incubation. The patient, as a rule, does not feel obliged to go to bed, and keeps at work in spite of his indispositin to exertion. As his malaise increases, however, he seeks medical aid, and the thermometer then usually shows a degree or more of

fever and the illness may be said to have begun. It is only very seldom that the disease begins suddenly without any prodromes. In such cases it may happen that the first symptoms of the disease is a chill, followed by a rapid rise of the temperature to 104° F. or beyond.

FIRST WEEK;

The onset of the disease may be dated from the time that a decided elevation of temperature occurs. With the advent of fever the patient begins to feel really ill. His weakness increases from day to day, his appetite is lost, and he complains of constant thirst and headache. The tongue is coated with a white fur, except the edges and tip, which are red, and there may be slight epistaxis. There is often diarrhoea, especially if a cathartic has been give at the beginning of the illness. Some patients suffer from deafness and ringing in the ears. In many cases the disease begins with a cough, and bronchitis symptoms. The spleen is usually enlarged and can often be detected by palpation. The temperature continues to rise steadily, being a degree or more higher each evening than on the evening before, until towards the end of the week from the day of onset it reaches 103° or 104° or even 105° F. The pulse rate is quickened, but not always in proportion to the fever. It ranges from 90 to 1 00, and is soft and sometimes dicrotic even at this early period. The patient feels tired, is usually obliged to remain in bed; if he stands up he feels dizzy and unsteady.

SECOND WEEK;

The above symptoms now undergo aggravation and have others others added to them. The temperature each evening maintains with slight variations the maximum height reached at the end of the first week, remitting in the morning a degree to a degree and one-half, the remissions being less marked in severe cases. There is less complaint of headache, the patients become apathetic and somnolent, and more or less delirious, particularly at night. The face looks dull, the tongue is tremulous and the prostration of the patient is marked. Bronchitis is usually present and the cough may be very distressing. There is more or less tympanitic distention of the abdomen with tenderness on pressure in the right iliac fossa. There is usually diarrhoea, the patient having from two to six loose yellow stools in the twenty-four hours. In some cases, however, there

is constipation from the beginning to the end of the disease. Between the seventh and twelfth days the characteristic eruption appears. This consists of small, circular, slevated, rose-red spots, disappearing on pressure. They are usually developed in successive crops. The skin is hot and dry, the face is flushed, sometimes livid. He may perspire, especially at night, and sudamina may be observed.

THIRD AND FOURTH WEEKS.

In cases of moderate severity the symptoms begin to improve commencing with the fourteenth to the sixteenth day. Improvement is usually first manifested by the temperature. The morning remissions become more and more decided, though the evening rise continues for several days. Soon, however, the fever declines in the evening also, and towards the middle or end of the fourth week the temperature is normal both morning and evening. With the decline of the temperature the general symptoms almost always improve. The tongue grows moist and tends to become clean, the diarrhoea ceases and the appetite returns. The patient sleeps soundly and awakes with a clear mind. His strength also returns gradually, though convalescence is slow even in mild cases and may be interrupted by complications. Occasionally, also, after perhaps a week or more of normal temperature, the fever may return and the patient has a relapse attended with all or most of the symptoms of the original attack, though usually in a milder form. The fever in severe cases fails to decline during the third week. The usual morning remissions may be less marked and the patient shows the effect of the continued high temperature and the prolonged toxaemia. The apathy and somnolance increase during the day and the delirium at night becomes more severe and more active. In some patients delirium predominates by day as well as at night, and they require watching and restraint. In the interval of active delirium the patient lies motionless in bed, sometimes muttering to himself, oblivious to his surroundings. He asks for nothing, but will drink if milk or water is put to his lips. The tongue becomes dry and brown and covered with sordes, or red and glazed in appearance. The lips are dry and cracked, and the teeth also collect sordes unless carefully looked after. The face is dull and care-worn. The urine and faeces may be passed

involuntarily. The abdominal symptoms also become more marked. The tympanitic distension increases and the diarrhoea is usually profuse. The pulse is rapid and weak. The first sound of the heart grows feeble. The bronchitis signs increase and the catarrh may extend to the smaller tubes. All these symptoms may continue into the fourth week and then diminish and the patient slowly recover. Or various complications, to be described later, may arise and prolong the disease or cause the death of the patient. In some cases death results from simple exhaustion, or cardiac failure. There may also be intestinal haemorrhage, or peforation of the bowel with resulting peritonitis and collapse. In cases which are severe from the onset, all the above symptoms may be observed as early as the second week of the illness.

CONSIDERATION OF THE PRINCIPAL SYMPTOMS.

P H Y S I O G N O M Y.

From the very beginning of the attack of enteric fever the face has a listless and languid expression, although the eyes are usually bright and the pupils dilated. In mild cases no further alteration of the expression of the countenance than this may be noticeable during the whole course of the disease, but in grave cases, when the typhoid state is fully developed, the expression becomes dull and heavy. There is, however, never the general suffusion of the face seen in typhus. On the contrary, the face is often pallid; or there is at most a circumscribed flush on one or both cheeks, which is most marked during the exacerbations of fever or after the administration of food or stimulants.

T E M P E R A T U R E.

The temperature curve in enteric fever is one of the most characteristic features of the disease. It often allows of a diagnosis when other symptoms are absent; it is also of great importance in prognosis, and furnishes valuable indications for treatment. Winderlich and others, from a close study of a large number of cases, have discovered that the pyrexia has certain characteristics which distinguish it from other fevers, and which being present in a case in which the other symptoms are obscure or ill defined, will often enable us to recognise its true nature. The course of the fever may be divided into three periods each having its own peculiarities.

It is usually said that each period lasts about a week, but in severe cases the second and third periods extend over a longer time than this, and the occurrence of a complication or of any other disturbing influence will have its effect in producing either a prolongation of any one or more of these periods, and especially of the last two, or an unwonted elevation or fall of temperature. During the first period there is a progressive rise of temperature, but the rise is never so abrupt as in typhus and certain other diseases. As there are morning remissions, ranging from a degree to two degrees in extent, corresponding to the morning fall in the daily variations of temperature, the tracing upon the temperature chart will be a zizzag or staircase line, each evening temperature being froma degree and a half to two degrees higher than that of the proceeding evening, while the same difference will be observed in the morning temperature. The temperature ought, therefore, never in an uncomplicated case to be much over 100° on the first evening or 102° F. on the second. A temperature of 104° at any time during the first or second day will consequently exclude enteric fever from the diagnosis. From six to eight days are usually occupied before the maximum is reached. It has been seen to be attained as early as the fourth day in mild cases, and, on the other hand, not until much later in severe ones. It is usually 104° or 105°, but will, of course, vary with the gravity of the other symptoms. The temperature rarely rises higher than 106° at this period. On the other hand cases occur in which it never exceeds 103° during the whole duration of the disease; and it would , therefore, be wrong to exclude enteric fever from the diagnosis, as Winderlich does, if this temperature is not reached by the sixth day, or the eight at the least. The temperature usually ceases to rise in the next period, but has a tendency to oscillate about the maximum temperature of the previous period at a fixed point, occasionally not quite reaching it, or at other times rising a little above it. The morning remissions too, become less decided. In other words, now becomes continuous. This period, although usually lasting about a week, may extend over more than two weeks, even in the absence of complications, in cases which run a severe course, and when it is prolonged from this cause the temperature may again show a tendency to rise, and may even attain an elevation considerably above that of the preceding period. The proghosis in all such cases

in which the temperature rises after the middle of the second week is grave. Temperatures of 108°, and even of 110° 3°, have been recorded at this time. Death invariably follows such hig h temperatures as these, but before death actually occurs a considerable fall of temperature very often takes place. Winderlich has also called attention to the fact that it is not uncommon for a sudden and temporary remission of temperature to take place at this stage, varying from one degree to two degrees and a half, which may last from ten to twelve hours, and which usually has occurred in his experience from the sixteenth to the eighteenth day. Toward the close of the second period the morning remissions will be observed to be more decided, while the evening temperature remains about the same as before. The beginning of the third period is indicated by a diminution of the evening exacerbation, while the morning remissions, become still more marked. The diminution is progressive but slow, the temperature each evening falling short by from half a degree to a degree of the point it reached the preceding evening. The morning remissions, on the other hand, each day become greater, a fall of three and a half degrees being not uncommon. The lysis, therefore, occupies usually a longer time than was required by the pyrexia in reaching its maximum. Towards the close of this period the morning temperatures may be normal, and even subnormal, while an elevation of temperature may continue to take place in the evening. Occasionally, however, an abrupt defervescence takes place. The duration of this period will be very much prolonged if complications are present or if the intestinal ulcers are slow in healing. It may last for more than three weeks. During convalescence the temperature is frequently subnormal even in the evening, but the slightest cause is often sufficient to produce a considerable though temporary elevat ion of temperature. Thus it may rise from 99° F. to 105° 6° in a few hours in consequence of an indescretion in diet, or, again, from 100° to 104° from the suffering and excitement caused by a severe attack of tooth-ache. In discretions of diet are a prolific source of these recrudescences of fever. The fever of the third period has all the characters of an irritative fever, and is probably kept up by the irritation arising from the intestinal ulcers. On the other hand that of the first two periods is due to to the action of the specific poison upon the nervous system and the other tissues of the body. The febrile movement, however,

perfectly
rarely follows a typical course, and very few temperature charts will bear, except during the first period, anything more than a general resemblance to the chart which Winderlich has prepared as typical. A very slight cause will exercise, as has already been said, a disturbing influence upon the course of the fever, and serious complications or accidents will obviously produce a still more marked effect. An intestinal haermorrhage, for example, will cause a rapid and a decided fall of temperature, even from, say, 104° to normal or below it. This depression, unless the bleeding continues and the case ends fatally in the course of a few hours, is only temporary, the temperature rising within twenty-four hours to its former height or even beyond it. A free epistaxis or a copious diarrhoea will in the same way cause a fall of the temperature, but it is rarely so marked as in the preceding case. The same effect will be produced by the administration of a large dose of quinine or by the application of cold water either in the form of the bath, the douche, or any other form, to the surface of the body. On the other hand, the occurrance of a complication will cause a rise of temperature often considerably above the maximum of the first period. The thermometer should be used at least twice daily. It is in this country generally introduced into the axilla, and less frequently into the mouth, for the purpose of making an observation. In other countries it is no infrequently inserted into the rectum, and even into the vagina. The temperature should be taken about eight in the morning and eight in the evening in order to secure reliable observations.

THE SKIN.

The skin is dry as well as warm in some severe enteric fever, the warmth varying with the pyrexia, But, on the whole perspiration occurs with greater frequency in enteric fever than in any ~~of the~~ other acute disease, unless it be rheumatism. It takes place most commonly at night after the evening exacerbation, or in the morning when the patient awakes from sleep, but it is not very rare to find the skin clammy at other times. The sweating is usually general, but in a few cases it is local only. When colliquative, it is frequently exhausting, and is then a grave symptom. It is sometimes prolonged into convalescence, when it is not only annoying, but in consequence of the prostration it induces may delay the patient's recovery.

The writer has never been able to satisfy himself that any peculiar odour is given off by the skin in enteric fever, and most observers make a similar statement, Chomel, however, asserted that the perspiration has a strong acid odour, and Bartlett agreed with Nathan Smith in thinking that enteric patients exhale a peculiar odour, not pungent and ammoniacal, like that of typhus, but of a musty and almost cadaverous character. During the later stage of severe and fatal cases this is said to be especially noticeable.

THE ERUPTION.

The exanthem in enteric fever is characteriestic and its study is second only in importance to that of the temperature. In deed, in many cases, without it diagnosis would be impossible. It is rarely absent in a well-developed case, but occasionally no eruption whatever is to be found, even on careful and repeated search. From an analysis of the figures of various observers it appears that the eruption is absent throughout the disease in about twenty per cent. of all cases. It is most frequently present in cases between the ages of ten and thirty years, being absent in only ten per cent. In cases under the age of ten the eruption was not found in about twenty-two per cent. In cases over the age of thirty, it was absent in sixteen per cent. The eruption consists of rose-coloured spots, slightly elevated above the surface, circular in form or nearly so, having well-defined margins, usually about a line in diameter, but sometimes varying from half a line to two or even three lines in diameter, and disappearing on pressure, to return when the pressure is removed. They are generally first observed sometime between the seventh and fourteenth days, but cases are on record, especially in children in which they are said to have appeared much earlier, and others in which they could not be discovered until the twentieth day. In the latter cases, however, it is not improbable they had really been present at an ~~an~~ earlier period, but had escaped detection. The eruption occurs in successive crops at intervals of three or four days, each spot lasting from three to five days, and the whole duration of the eruption being usually from ten to twenty, and varying, of course, with the severity of the attack. It may continue to appear as late as the twentieth day and in cases of relapse very much later. Spots are sometimes seen in the abdomen or elseweher after the subsidence of the fever, and whenever seen indicate that the diseased process is not at an end. They are

usually scattered over the lower part of the front of the chest and the abdomen, but also not infrequently are met with upon the back, and if they are not found upon the abdomen, the patient should be gently turned upon his side and this part of the body carefully examined. When very abundant they are often also seen upon the extremities, and occasionally even upon the face. They have, moreover, been seen in abundance on the upper and inner part of the thigh, and confined to that place. When tardy in making their appearance, they may often be brought out of application of a mustard blister or by that of heat in any form; and is probable, therefore, owing in a large measure to the warmth of the bed that they are often so fully developed upon the back. In number they may vary from tow or three to several hundred. In one case Murchison counted one thousand; and the body has been so thickly covered by spots of an unusually large size as to give the disease a marked resemblance to typhus fever. When very numerous the edges of two or three of the spots may run together, giving the eruption an irregular character. No relation between the copiousness of the eruption and the severity of the disease has ever been established. While , the prevailing impression , therefore, that in cases in which the eruption is freely developed are apt to be of a mild character, is true in many instances, it is by no means so in all. The spots disappear after death, and are rarely converted into petechiae, but in bad cases purpuric spots have been seen, and even vibices, developed independently of them. They are said to be most common in patients of haemorrhagic diathesis. Sometimes the appearance of the eruption is preceded for a day or two by a diffuse erythema, which may cover the entire body. When it occurs in association with sore throat it is apt to be mistake n for scarlatina. Murchison has seen it persist throughout the fever to which, however, it is not peculiar, as it is seen in other diseases.

SUDAMINA - so-called from their resemblance to drops of perspiration -- occur not infrequently in enteric fever. Murchison found them in one-third of his cases. They are minute vesicles, often not larger than a pins head, but sometimes two lines in diameter, and occasionally in cases in which two or three have coalesced, much larger. They usually contain at first a clear serum, which may, however, subsequently become turbid, and when very minute must, in consequence of their transparency, be viewed obliquely to be seen. Frequently, when they cannot be distinguished by the eye, they are readily detected by the touch.

They rarely occur before the twelfth day, and not often before the close of the third week. Their most usual seat is the neck, folds of the axillae, and the groin, but there is no part of the body except the face in which they may not occur. They are most frequently seen in those cases attended by profuse sweating, and are by no means peculiar to enteric fever (they were thought by Louis to be specific of the disease), but are met with in other maladies - as, for instance, acute rheumatism - which are attended by this eruption, They are generally followed by desqhamation of the cuticle of the parts of the body most affected.

Spots of a pale blue colour and of varying size and form, are occasionally observed upon the skin in enteric fever. The French have designated them "taches blenatres". They are of an irregularly rounded form and from three to eight lines in diameter. They are not in the least elevated above the skin and do not disappear on pressure. They have a uniform tint throughout there extent, and they never pass through the successive stages observed in the spots of typhus. Two or three of them are sometimes confluent. They often follow the course of the small subcutaneous veins and are most commonly found on the abdomen, back, and thighs, They are met with in other diseases, and are supposed to be due to pedicilli.

Apart from the development of sudamina, the skin may undergo desquamation in fine branny scales. The hair is very apt to fall out after an attack of enteric fever. The nails suffer in their nutrition. in common with other parts of the body - a fact which may be recognised by the peculiar markings which are found upon them after recovery.

C I R C U L A T O R Y S Y S T E M.

From the beginning of the attack of enteric fever the pulse usuall y undergoes acceleration. This in degree is commonly proportional to the severity of other symptoms, and especially to the elevation of the temperature, and is generally more marked in the evening than in the morning. It is subject, however, to numerous variations, not only in different cases, but even in the same case from day to day, and even from hour to hour. Murchison refers to a case in which the pulse sank to 37, and never exceeded 50 during the fever, although it rose to 56 during the convalescence. A comparatively infrequent pulse may coexist with a high temperature. As a rule, the pulse is more frequent in cases which terminate fatally then in those which

end in recovery; but to this rule there are numerous exceptions. In eight of Louis's cases it never went above 90, and , it seldom exceeds 100, On the other hand, in mild cases the pulse may be exceedingly frequent, reaching, and even exceeding in many cases 120. When the disease is prolonged and the prostration extreme, a pulse of from 140 to 150 is not uncommon. During convalescence the pulse usually gradually diminishes in frequency, and may sometimes fall below the normal standard. In other cases, on the contrary, the pulse continues frequent during convalescence, or readily becomes so after a slight exertion or excitement of any kind. A slow pulse during convalescence appears to be most frequent in men whose health previous to the attack was good, and a frequent pulse in women and delicate men. The pulse retains its frequency so long as ever convalescence is retarded by a complication. The pulse will, of course, present other changes than these. It is in the beginning firm, and full, but after the first week becomes firm and compressible, and acquires the peculiarity known as reduplication. Sometimes when this is not well developed, it will be rendered quite distinct by elevating the patient's arm. Irregularity or intermission of the pulse, although not commonly observed in this disease, occasionally occurs.

The action of the heart will also be observed to grow feeble in the course of severe cases, and its first sound indistinct, but neither of these changes is so marked in typhoid as in typhus fever. Hayem says that in a certain number of cases a systolic bellows murmur, with its point of greatest intensity at the apex, is heard during the course or at the close of the second week. This murmur is sometimes soft in the beginning, but becomes harsh and intense later, or may have these characters from the start to such a degree as to give rise to the suspicion of endocarditis. The anaemic murmur is frequently present during convalescence.

RESPIRATORY SYSTEM.

The respiration is usually accelerated in enteric fever, as in all febrile conditions, independently of any disease of the lungs, and its frequency is generally proportional to that of the pulse. The respiratory movements are less liable to fluctuate from day to day than the pulse, and when the latter becomes abnormally infrequent they do not sink below the standard of health. Murchison found the pulse 42 at the same time that the respirations were 48,

and that, too, in the absence of pulmonary lesions. The respiration is often, as in the case just alluded to, very much accelerated when the most careful examination of the chest will not lead to the detection of any disease there. This is sometimes the consequence of very great tympanitis, which, by interfering with the descent of the diaphragm , gives rise to dyspnoea, but it may also occur as a purely nervous phenomen. Bronchitis of greater or less severity , is so constantly found in enteric fever that it is to be regarded as a symptom rather than as a complication of the disease. The frequency of bronchitis seems to vary greatly in different years and in different epidemics. Murchison found it in only twenty-one out of one hundred cases, but in the experience of others, some signs of bronchial trouble are found in all but a very small minority of cases. Sometimes there may be very slight harshness of the respiratory murmur at the base of the chest, but in a large number of cases the auscultatory signs will be sonorous, sibilant, and mucous râles. The last named may be so numerous as to lead to the disease in the beginning being mistaken for acute bronchitis or acute phthisis.

D I G E S T I V E S Y S T E M.

Except in mild cases, loss of appetite is one of the earliest symptoms of the disease, as usually persists as long as the fever lasts. It is sometimes accompanied by positive loathing for food, but generally there is no difficulty in persuading the patient to take the necessary amount of nourishment. During convalescence the appetite returns and the patient clamours for food owing to his insatiable hunger. Thirst is usually present early in the attack, and is generally proportionate to the degree of fever. As the disease progresses it becomes less marked.

Nausea and vomiting sometimes occur at the beginning of illness, and the patient may be regarded at first as suffering from merely a bilious attack. Murchison noted vomiting in 36 out of 100 cases, and regarded it as a favorable symptom when occurring at this stage. Later in the disease, however, it may be the first s ymptom of peritonitis. It may sometimes occur during convalescence and interfere very materially with the proper nutrition of the patient. The vomited matter usually consists of a greenish bilious fluid, with the food last taken. In some cases blood may be expelled from the stomach.

At the beginning of the attack the tongue is

is usually moist and coated with a thin white fur, and in mild cases may retain these characters until the close. Even in some cases which terminate fatally in the course of the second seek, the tongue, with the exception of being less moist than in health, may present no marked deviation from this appearance. Generally, however, as the disease progresses, and sometimes as early as the tenth day , it becomes dry and brownish, and is protuded with a tremulous motion. Still later it tends to cover itself with a thick brown coating. This coating is disposed principally along the middle of the organ , leaving uncovered, the edges and tip, which are very apt to be unnaturally red in colour. The bare portion at the tip is often rudely triangular in shape -- a point which is regarded by Da Costa as of some importance in the diagnosis of the disease. In bad cases, however, during the course of the third week the tongue is frequently crossed by cracks and fissures, which are the cause of much discomfort to the patient, and when deep may bleed and leave behind them scars which are recognisable during the remainder of his life. In other cases the the tongue is dry, brown, and shrivelled, or covered with a tenacious, viscid secretion which makes its protusion a matter of considerable inconvenience. In favorable cases, as convalescence approaches the tongue regains its normal appearance. At first the only noticeable change may be that the organ is a little less dry than before. In a few days it will be observed to have become moist and to be gradually throwing off its coating. The process is, however, a slow one, moreover, subject to frequent interruption. Very often, when it seems nearly completed it will be suddenly arrested, and the tongue becomes dry and brown. Sometimes, instead of cleaning gradually, the tongue throws off its coating in large flakes, leaving the mucous membrane red, and shining, as if deprived of its papillary structure. It is believed by many that if the tongue when thus cleaned remains moist convalescence might be expected, but would always be tedious. If anything happens, however, to interfere with the progress of convalescence, it not infrequently becomes dry and coats itself over again. When the restoration to health is retarded by the continuance of diarrhoea or by the occurrence of any intercurrent affection, the tongue will often become pale and flabby, and superficial ulcerations or aphthons exudations may be found upon it.

The lips and teeth are in bad cases covered with sordes, and the former are dry and cracked and bleed easily. The dryness of the lips and tongue is favoured by the tendency of the patient to breathe through the mouth. The gums may become spongy and bleeding occur from them.

The mucous membrane of the fances is also often red and covered with a tenacious secretion; swallowing may thereby be greatly impeded.

Tympanitis or meteorism is present in most cases of enteric fever. Murchison noted it in 79 out of 100 cases. In 17 the distension was extreme and in 7 of these death occurred, whereas of 21 cases in which there was no tympanitis, none was fatal. Louis noticed great meteorism in one-half of his fatal cases, but in only 7 of 88 cases which recovered . It is, as a rule, later in making its appearance than the other abdominal symptoms, showing itself usually about the end of the first or the beginning of the second week. It is generally most marked in grave cases, especially those attended by severe diarrhoea, but it has been seen highly developed in cases in which the symptom was not present at all or but little developed . It may vary, moreover, frequently in degree at different times in the same case, but when once present generally persists until convalescence is established or death occurs. When extreme it may give rise to distressing dyspnoea, the descent of the diaphragm being prevented by its upward pressure.

Accompanying the tympanitis are usually gurgling and tenderness on pressure in the right iliac fossa. The former of these symptoms is most marked in cases in which diarrhoea exists, and is caused by the presence of liquid and gas in the lower part of the ileum. The tenderness is a symptom of considerable diagnostic value, as it is unquestionably due to the presence of ulcers in the same part of the bowel. It is, however, often absent in well marked cases of enteric fever.

Enlargement of the spleen is a most constant symptom of enteric fever as of other acute infectious processes. It was noted by Halle as being present in some of his cases. It may generally be demonstrated by percussion at the end of the first week or during the first part of the second week, as tympanitis has not usually developed at that period. It has not, however, often happened to the writer to be able to feel the organ enlarged xxx through the abdominal wall, as Murchison and others assert they have been able to do. Indeed, meteorism is usually present in a sufficient de-

gree

to render this difficult. According to Murchison, the enlargement is greatest in persons under thirty years of age. It is said to be often absent in elderly patients.

One of the most frequent symptoms of the disease is diarrhoea, especially in severe cases, and there are very few mild cases in which it does not occur at some period of their course. Louis noted it in all but three of his cases, Murchison in 93 out of 100, and Barth in 96 out of 101. It varies in different cases in severity, in duration, and in the time when it appears. It may be one of the earliest symptoms, presenting itself frequently on the first day, and after being the only one which occasions uneasiness to the patient or his physician. At other times its appearance may be postponed until the end of the first week, or even until the patient is apparently entering on convalescence. It may be mild in the beginning and become more severe as the disease progresses, or after having been at first acute may cease spontaneously in a few days. In degree it may vary from two stools to three or four, or even twenty, in the course of the twenty-four hours. It is absent in a few cases, but in many of these cases the bowels will be found to act inordinately after a mild purgative. Constipation does, however, actually exist in a certain number of cases. Murchison has known the bowels in cases in which a relapse has occurred to be constipated in the primary attack and relaxed in the relapse. There is no relation between the severity of the diarrhoea and the extent of the local lesion. Although oftenest seen in mild cases, constipation has existed in cases in which perforation of the bowel or intestinal haemorrhage has occurred during life, or very extensive lesions have been discovered at the autopsy.

The characteristic stools of enteric fever are of a particular offensive odour, ammoniacal, and of an alkaline reaction instead of acid as in health. They are usually liquid and resemble pea soup in their yellow ochre colour as well in consistence. Murchison says they separate, on standing, into two layers - a supernatent fluid, and a flaky sediment -- but that, occasionally instead of being watery they are puttaceous, frothy and fermenting, and so light as to float in water: Bartlett compares their appearance to that of new cider. They may contain blood, and when they do, occasionally present the appearance of coffee-grounds.

Intestinal haemorrhage is a rather infrequent

symptom of enteric fever. It may occur as early as the fifth or sixth day, but is more common after the middle of the second week or in the third or fourth week. In 60 cases observed by Murchison in which the haemorrhage exceeded six ounces it began during the second week (mostly towards its close) in 8; during the third week in 28; during the fourth in 17; during the fifth in 1; during the sixth in 3; during the seventh in 1; and during the eight in 1 ; while in one case the date of its occurrence is not noted. There may be a slight haemorrhage, or the bleeding may be repeated one or more times. In several of Murchison's cases it recurred after the first appearance at varying intervals.

The bleeding is usually of trifling amount when it occurs early in the disease, and is due either to extreme congestion of the intestinal mucous membrane, giving rise to rupture of the capillaries, or to disintegration of the blood allowing its ready passage to the walls of the vessels. In the latter case it usually coexists with petechial or a haemorrhage from some other part of the body, as, for instance, epistaxis or haematuria. After the middle of the second week the haemorrhage is generally the result of the laying open of a small artery, either by the detachment of a slough from one of glands of Peyer's patches, or by the involvement of its walls in the ulcerative process. It is then often profuse, and may then even reach several pints in quantity. Murchison has, however, seen profuse haemorrhage at such an early stage of the disease that it was impossible that ulceration culd have taken place. The blood is not always voided immediately after a haemorrhage has taken place; it may be retained for some days. Indeed, if the amount be large the patient may die within a few hours of its occurrence without any appearance of blood externally This is, however, rare; it is more usual for the haemorrhage to be repeated before death takes place, but the occurrence of the bleeding may be suspected in such cases by the abrupt fall of temperature, sometimes below the normal, and by the extreme prostration and pallor which come on suddenly without other assignable cause. The depression of temperature does not continue long, as, in the curse of the twenty-four hours, it generally reaches its former elevation, or even exceeds it.

The frequency of intestinal haemorrhage apparently varies considerably with different observers and in different epidemics under the same

observers. Murchison noted in 58 cases of 1.564 or 3.77 per cent; Louis in 8 cases of 134, or 5.9 per cent; and Griesenger in 32 of 600, or 5.3. per cent. Strümpell states he saw at Leipsic in in the course of several years 45 bleedings in 472 cases, this 9.5 per cent. In one year (1880) the percentage rose to 18. On collating the experience of various observers it appears that haemorrhage from the bowels took place in 277 out of 4,594 cases, or in 6 per cent. It is said to be twice as frequent in women as in men. It seems to be much less common in children than in adults, for in 252 patients under fifteen years of age observed by Taupin, Killiet, and Barthez it occurred in 1 only. There is considerable diversity of opinion among observers in regard to the importance of this symptom. Murchison lost 32 of his 60 cases . In 11 of the 32 fatal cases the immediate cause of death was peritonitis; in 14 of the remaining 21 cases the patients died within three days of the bleeding and in 8 of the 14 within a few hours. Of Griesenger's 32 cases 10 terminated fatally several days after the bleeding. Many clinicians have asserted that the

effect of the haemorrhage was sometimes beneficial. Chief among these are Graves and Trousseau. There may be occacionally a slight subsidence of the nervous symptomsupon the occurrence of a haemorrhage , consequent upon the reduction of temperature which usually accompanies it, but this relief is only temporary, and this relief is procured at too great an expense to be really of service to the patient. The bleeding is most frequently observed in serious cases. In 18 of Murchison's 60 cases the antecedent symptoms were mild. In 8 others, 6 of which were fatal, the bowels had been constipated up to the time of its occurence. The blood if voided immediately after the escape into the intestines, is generally fluid and bright red in colour. When retained for a day or two it is passed in dark clots, and if retained longer than this it is usually mixed with faecal matter when discharged from the bowels, and gives the stools a tarry appearance and consistence.

It is sometimes asserted that intestinal haemorrhage has become more frequent since the introduction of the cold-bath treatment of enteric fever. It is argued that the anaemia of the skin produced by the cold water must cause a determination of blood to the internal organs, including the bowels, and thus favour haemorrhage therefrom. The writer's experience goes to prove that the contrary is the case, namely , that haemorrhages have diminished in frequency under the cold-water treatment. Nevertheless, he agrees with other practitioners that when intestinal haemorrhages does occur, it constitutes a contraindication to the use of cold baths in this disease.

N E R V O U S S Y S T E M.

The symptoms of disturbance of the nervous system are among the most important as well as the most constant of the clinical phenomena of enteric fever. Although the specific anatomical lesions of the disease are situated in the intestines, many a case will run its course without a single symptom referable to the abdominal organs. Instances have been reported in which the intestinal changes have themselves been wanting, although the cases ended fatally. The nervous symptoms, on the other hand, are always present to a greater or less extent, even in the mildest cases. Hence the term "nervous fever" so much employed by the older writers in connection with this disease. It wasformerly generally

believed that these symptoms were caused by the prolonged high temperature. Under this view it was difficult to explain their presence in cases in which the pyrexia is very moderate or even wholly wanting, and in many of these cases characterised by a low temperature the nervous disturbances are very marked. The bacteriological researches of the last two decades, or so, to which we are indebted for a correct understanding of the etiology of enteric fever, have also furnished us with a clear explanation of the nervous symptoms. It is the specific infection of the disease, the toxaemia, which is the cause of the derangements of function of the nervous system. Prolonged high temperature may also be a factor in their production, but it is not an essential one.

Headache is one of the most constant symptoms of enteric fever, and often the first symptom of which the patient complains, and when not present at the beginning of the attack, makes its appearance soon after. Bartlett says it is rarely absent, Louis found it in all but 7 of 133 cases, and Murchison noted it in 77 out of 82 cases. It is almost as common, though less severe , in mild cases as in grave ones. It sometimes persists through the attack, but oftener subsides at the close of the first week or towards the middle of the second , or the patient may cease to complain of it in consequence of the dulness which is very apt to supervene. It is usually referred to the forehead and temples, but may extend over the whole head, It is usually dull and heavy, but in a few cases is throbbing. Sometimes it is very severe and may be paroxysmal or neuralgic in character. It has been known to be so acute as to cause the disease at its commencement to be mistaken for meningitis.

Dizziness or vertigo is often noted during the stage of incubation and even later in the disease. It is seldom encountered during the height of the fever, but may manifest itself again at the beginning of convalescence.

Distressing pains in the back and limbs may also occur, and in rare cases even contraction of the hands and feet. There is often likewise a general aching of the whole body, with a sensation of extreme weariness.

Wakefulness at night is usually suffered from at the beginning of the disease, and it occasionally happens that this is a distressing symptom.

Often somnolence supervenes sooner or later in the course of the disease. In mild cases this symptom is late in making its appearance, and is

generally slight and evanescent, but in grave cases it may come as early as the eight day, and when once present may gradually become more profound until it deepens at last into unconsciousness. It usually persists until the occurrence of death or of convalescence, but may alternate with periods of delirium, the delirium being more frequent at night and somnolence by day. It is as frequent in children as in adults. Occasionally the wakefulness of the earlier stage may reappear at the beginning of the third week, and coexist with muttering delirium, or occasionally with delirium of a more violent character. It then constitutes a most unfavourable symptom, the patient frequently passing several days and nights in incessant agitation, until death from want of sleep closes the scene.

Mental Lebitude or dulness is present in the vast majority of cases, even in the mildest attacks of enteric fever. It may, however, be absent occasionally in cases which run a severe course. It shows itself in the beginning by way of an indisposition to be disturbed, a slight inability to fix the thoughts, or a loss of memory. Generally, the patient will be able at first, by an effort to rouse himself from this apathy, but the moment he relaxes this effort will lapse into his former condition. As the disease progresses the Lebitude becomes more profound and is overcome with greater difficulty. In mild cases it may continue until the occurrence of convalescence, but in grave cases it is soon lost in delirium.

Delirium is said to be present in the majority of cases of enteric fever. In Murchison's series of 100 cases it was absent in only 33. Other observers have found this symptom less frequent. In the writer's experience fully one-half of the patients passed through the attack withou t any delirium whatever. Probably the cold-bath treatment keeps the mental faculties unimpaired. The frequency and severity of the delirium vary with the intensity of the infection, though its absence does not always indicate a favourable termination of the disease. Of Murchison's 33 cases in which there was no delirium, death occurred in 3, whereas of the other 67 cases, 18 were fatal. The delirium, of course, as said, varies with the severity of the other symptoms, and especially with the intensity of the fever. In its mildest form it consists of a slight confusion of ideas, which is readily dissipated by fixing the patient's attention, and is most apt to occur in the night or when he first wakes up from sleep. In other cases it is much more marked; occasionally it is violent and

noisy; the patient may talk wildly and incoherently, he may break out into a paroxysm of screaming, or possessed with a suden terror, he may leave his bed and attempt to rush from the room or jump from the window. Later in the course of the disease the active delirium subsides, and a low muttering one takes its place. The latter may go on until convalescence occurs, or the patient may fall into a comatose condition, and die therein. The delusions from which the patients suffer are generally connected with some event in their past life. Very frequently the patients insist that they are in a strange place, and beg piteously to be taken home to their friends; occasionally , in grave cases, the patient declares there is nothing the matter with him. This Louis was accustomed to regard as a bad symptom, having never known a recovery to take place after it. Delirium generally first makes its appearance some time in the course of the second week, but occasionally the invasion of the disease is marked by maniacal excitement. It has been known to occur on the second or third day. Louis records two cases in which it was present during the first night, and Bristowe (Trans. Pathol. Soc., vol. xiii) one in which it was noted on the first night. It is sometimes so prominent a symptom at the beginning of an attack that the patient has been at first supposed to be affected with acute mania. Motet (Arch. gén. de Méd., 1860) refers to a case in which a man was actually admitted into a lunatic asylum before the true nature of the disease became known. On the other hand, delirium may not occur until later in the disease- sometimes not before the close of the third or even the fourth week, When it may suddenly make its appearance when least expected.

In cases in which there has been much mental disturbance during the febrile period, the convalescence may be marked by an impairment of intellect, and this may continue after recovery in other respects is complete; but it is rarely a permanent condition. In some cases the moral sense appears to be weakened after an attack and thieving propensities developed in persons or previously good habits. Insanity may also occur during the convalescence or after recovery, but it is usually under these circumstances amenable to treatment.

From the beginning of enteric fever there is nearly always present more or less muscular prostration. It is usually most intense in grave cases, but to this rule there are numerous exceptions. It is not rare to find patients , in whom the other symptoms are severe, able to sit up in bed,

and even to rise to stool, throughout the attack. Occasionally in mild cases, patients are not confined in bed at all during the disease. Even in fatal cases there is sometimes but little prostration. Bartlett records a a case in which the patient did not confine himself to bed until the occurrence of perforation. Generally , however, the prostration becomes extreme in the third and fourth weeks of the disease, the patient lying helpless on his back unable even to turn from side to side.

Tremor is a constant symptom of enteric fever, even in the mildest cases. A little tremulousness of the tongue when produced may often be detected before the close of the first week. A little later the hands will be observed to tremble when held up, and still later twitchings of the tendons at the wrist may be appreciable while the pulse is being felt. When muttering delirium supervenes this subsultus tendinum becomes constant, and extends to other parts of the body. The hands of the patient are frequently then in constant motion, either picking at the bed-clothes or at the lips or nose- carphology - or an aimless motion of the hands through the air. These automatic movements indicate a very profound disturbance of the nervous system, and are very unfavourable symptoms. Hiccough, is sometimes observed late in grave cases, and is a bad symptom.

Even in mild cases spasmodic contraction of various groups of muscles may occasionally be observed. It is especially frequent at the very beginning of the disease. The muscles of the extremitites, especially those of the legs, are oftenest affected, but those of the trunk and neck may also be involved. The head may be retracted as in meningitis; these may be a condition of torticollis, or of strabismus early in the attack. Murchison has had patients under his care who have suffered from spasmodic contraction of the pharynx to such an extent that they could not swallow. He also reports cases in which trismus, and spasm of the glottis have been present.

ORGANS OF SPECIAL SENSE.

Vision - During the attack of enteric fever imperfect or perverted vision may occur. Sometimes haziness of vision, and even visual illusions are observed. In addition to strabismus, Murchison and Bartlett have often known photophobia present in cases characterised by active febrile excitement. As a general rule,

the pupils are widely dilated and the conjunctiva pearly white. When, however, stupour supervenes in bad cases, the pupils are very often contracted, and Murchison has known them under such circumstances to be as contracted as in typhus. In a few cases unequal dilatation of the pupils has been noticed.

Organs of hearing - In the early stage of the disease ringing or buzzing noises are present in the large proportion of cases, and may sometimes persist until the disease it well advanced. Usually, however, after a few days they subside and give place to deafness. This is a very common symptom and may affect both ears or be common to one. In the former case it may be due to the blunted perceptions of the patients, or the catarrh of the Eustachian tube (Trousseau) , and is without special significance. Recovery without impairment of hearing is the rule. Deafness of one ear, however, is a serious condition, being due perhaps to suppurative otitis. This may lead to meningitis.

Modifications of Sensibility - Hyperaesthesia of the skin is not a frequent symptom. Murchison noted it in 5 per cent. of his cases. He did not consider it of much importance. It may occur at any stage of the disease; it is chiefly observed in the abdomen and lower extremities; and is more frequently met with in women and children than adult males. In some cases the skin is so sensitive that the slightest touch causes the most exquisite pain. Occasionally the tenderness over the abdomen causes the illness to be mistaken for peritonitis, from which however, it can readily be distinguished by the coexistence of hyperaesthesia elsewhere. According to Murchison, tenderness over the spines of the cervical or dorsal vertebrae is usually present. He does consider it of much importance.

Anaesthesia of the skin may also occur, but it is certainly less common in the earlier stages than superaesthesia. Rilliet and Barthez regard it with alarm when occuring in children.

The sense of taste is frequently lost or perverted. This is due partly to the blunted perception of taste and partly to the thick covering of the fauces and tongue.

Nose- Epistaxis may occur at any stage of enteric fever, but it is most common during the period of invasion. Observers differ in regard to its frequency. Murchison noted it in only 15 of 58 cases, and believes that it is more common in France than elsewhere. On the other hand, Bartlett says that it is quite a common symptom.

The amount of blood lost may vary from a few drops to several pints. Unless profuse it has but little effect upon the course of the disease. Murchison has often seen patients die from its severity. In moderate amount it occasionally relieves the early headaches of the disease.

THE URINE.

In enteric fever the urine presents the general characteristics common to all acute febrile diseases. As the disease generally begins insidiously, the condition of the urine before the attack and during the first two or three days does not differ perhaps materially from the normal. During the latter part of the first week the amount of water is greatly diminished, occasionally falling to one-fourth or one-sixth of the usual quantity. In the second and third weeks it increases, and at the end of the fourth week may again be normal, The amount may, however. vary from day to day, but its variation s do not stand in close relation to those of the pyrexia; that is, the thermometer may register one day 104° , and the next day 100° , while the amount of urine remains the same. Still, when the temperature begins to fall permanently it increases at once, or two or three days later. The specific gravity is usually high in almost all cases in which the urine is scanty, and may be as high as 1038. With the establishment of convalescence the specific gravity often diminishes before the water begins to increase.

At the beginning the urine is very acid; this is due to its concentration, not to an increased excretion of acid. Later it may become alkaline, and even ammoniacal. The colour of the urine is very dark from an absolute increase of the pigments.

During the fever the quantity of the urea is augmented, and especially during the first week. As a general rule, the higher the temperature the greater the am ount of urea. Logel once found it to go as high as 1.200 gr. in the twenty-four hours. The occurrence of inflammatory complications, such as acute pleurisy, may reduce the amount of urea, even to a point below normal. It is not, however. influenced by the diarrhoea, hence, observes Murchison, the intestines cannot be regarded as a channel for the elimination of urea in this disease.

Uric acid is always increased early in the disease, the amount of increase being relatively

greater than that of the urea; it is often three to four times the amount excreted in healt; this increase takes place until about the fourteenth day, diminishing thereafter, and during convalescence falling to subnormal. Copious deposits of urates and lithates may occur at any time in the course of the disease.

The chlorides are greatly diminished in amount in enteric fever. This diminution is partly due to a less amount of chlorides being taken with the food, and partly to the fact that large quantities of salt pass away with the stools. As the diminution cannot always be fully accounted for in this way, it would appear that it is also stored up in the body during the fever.

The sulphates may be increased in amount. The phosphates are at first slightly diminished, but later on are increased. There is also a diminution of hippuric acid.

Albumim is very often present in enteric fever. Parkes found it in 7 out of 21 cases. In five of these it was temporary, and entirely disappeared before the patient left the hospital. Becquerel found it in 8 out of 33 cases, Andral in only 4 out of 34 cases. Griesinger found it commonly, though it was usually temporary. He met with only four or five cases in which it was never present. Kerchensteiner found albumim in a fourth part of the severe cases. Loomis reports it in 17 out of 34 cases in his wards in the New York Hospital. Osler noted a much higher percentage of albumin at the John Hopkins Hospital. During the six years from 1889 to 1895, 389 cases of enteric fever were treated in the hospital and albuminuria was noted in 303, or 78 per cent. The amount of albumin was usually small, in the majority only a trace. Albumin generally appears in the course of the second week, though sometimes as early as the first week of the disease. The albuminuria is usually of short duration and the quantity of albumin small. The contrary would point to severity of infection.

Renal casts are sometimes seen in the urine of enteric fever. They are usually associated with albuminuria, but sometimes not. They are usually of the hyaline and granular forms, and few in number. They generally disappear with the albuminuria, and do not necessarily add to the gravity of the case.

Sugar has not been found except in the urine of diabetic patients, who may have happened to contract enteric fever. In these patients the sugar diminishes, and is sometimes wholly absent during

the convalescence of the fever.

Typhoid bacilli, are present in the urine of a large proportion of cases. According to Bouchard, they are found only in albuminous urine. Seitz found in cultures from the urinary deposit in seven cases the bacillus typhosus present in two only. In those two cases the urine was albuminous and the number of colonies obtained was proportionate to the amount of albumin. Generally speaking, typhoid bacilli are present in about 30 per cent. of all urines examined during the course of the disease.

Ehrlich's Diazo Reaction. In 1882 Ehrlich described a reaction in the urine depending upon the presence of certain aromatic substances which form aniline colours in the presence of diazosalphobenzol. The latter is formed by the union of sulphanilic acid (amidosulphobenzol) and H n o 2. in order to o btain a fresh solution of diazosulphobenzol, a solution of sodium nitrite is added to a solution of sulphanilic acid containing 5 per cent. of hydrochloric acid. When the two solutions are mixed, H n o2 is set free, and diazosulphobenzol is formed. The following solutions, therefore, are necessary for the reaction.;

Solution A

Sylphanilic Acid... .... 1 part
Hydrochloric Acid(concentrated)..... 50 parts
Distilled water .....1000 "

Solution B.

Sodium nitrite ..... 1 part
Distilled water..... 200 parts.

It is advisable to keep the solutions in separate well-stoppered bottles in amber glass, and preferably in a dark place. They should be mixed as required by combining 50 c.c. of A. and 1 c.c. of B. The sodium nitrite solution does not keep well and should be prepared freshly at short intervals.

The test is applied by mixing equal parts of the urine and the mixed reagents; quickly adding one-tenth volume of ammonia water, and shaking. A deep cherry-red colour indicates a positive reaction, and if the reaction is marked, the foam will appear salmon-pink, or even deep-red in colour. A further proof of the true reaction would be the formation of a green precipitate on standing.

The chief value of the test lies in the diagnosis of enteric fever. It is present very constantly in svere cases of the disease, with an intensity usually running parallel to the severity of the infection. The clinical value of the diaz- reaction is, however, greatly lessened by several facts; (1) It often does not occur in the milder

forms of enteric fever until the acme of the disease has been reached, and at times is wholly absent in such cases (2) It occurs in many other diseases, notably in tuberculosis, pneumonia, pleurisy, diphtheria, erysipelas, etc.) in syphilis, cancer, septicaemia, pyaemia, rheumatism, etc. In practice the chief diseases in which it puzzles the diagnostician are tuberculosis and septicaemia. In pulmonary tuberculosis its presence is of bad prognostic import, and its persistence indicates an advanced stage of the disease. (3) The reaction occurs in the urine of persons who have been taking certain drugs - e.g., naphthalin, chrysarobin, etc. This reaction is, however, distinguished from the true diazo-reaction by the absence of a green precipitate occurring on standing for twenty-four hours, and by the fact that the colour does not disappear on the addition of acids. The appearance of the reaction may be inhibited by other drugs - e.g., gallic and tannic acids and their compounds, iodine, and the iodides.

COMPLICATIONS AND SEQUELAE

RESPIRATORY SYSTEM

Laryngitis is an occasional complication of enteric fever. When it assumes the diphtheritic form and runs on to the formation of ulcers it is a very serious complication, as it is not infrequently accompanied by oedema of the glottis, requiring tracheotomy for its relief. It appears, however, at least in its worst forms, to be of rather rare occurrence . German physicians do not consider it a rare complication

The frequency with which bronchitis in some form or other attends upon enteric fever has already received mention. When it invades the smaller bronchial tubes it occ asionally gives rise to lobular pneumonia or to collapse of some of the lobules of the lung. Lobar pneumonia may occur in the course of enteric fever, when it comes on late in the disease, especially if the patient is comatose, or even semi-unconscious, it may be entirely overlooked, unless the lungs are carefully examined, as it often does not reveal itself by any of the ordinary symptoms . It may, however, occur early . It sometimes terminates in abscess or gangrene, but is more usually followed by chronic pneumonia, which may eventually end in recovery or lay the foundation for pulmonary tuberculosis.

Pleurisy with effusio n is also not an uncommon complication, and it is manifestly of serious import. Murchison refers to three cases in which it was followed by empyema.

Other morbid conditions which may complicate enteric fever are ; oedema; , infarction, hypostatic congestion of the lungs, emphysema, and pneumothorax. Acute miliary tuberculosis is more often a sequel than a complication.

CIRCULATORY SYSTEM.

Endocarditis and pericarditis are comparatively rare complications of enteric fever.

Myocarditis is a frequent complication of severe attacks. Degeneration of the heart is probably present in some degree in every case of enteric fever. The lesion of the heart muscle - as in the case of endocarditis and pericarditis - does not differ from that found in other acute

infectious diseases. Myocarditis is always a serious complication, as there is always a danger of death by collapse or syncope.

Venous thrombosis is not a rare complication. It presents the same features and runs the same course as in other diseased. In rare instances, a portion of the thrombus may become detached and produce death by embolism.

Arterial thrombosis and embolism, giving rise to gangrene of the part supplied by the obstructed artery, are of occasional occurrence.

Gangrene is fortunately a very rare complication. Trousseau, Hayem, and others report or refer to several cases in which gangrene of the leg, hand, or cheek was observed, and among others a case in which it depended upon obstruction of the carotid artery and was located in the left ear, extending from thence to the forehead and cheek. Martin (Centralbl. f. Gynakol., 1881) reports the case of a woman who expelled from the vagina a foetid-smelling structure of cylindrical form, which proved to be the cervix uteri, with the upper part of the vagina. Spillmann (Arch. gen., March, 1881) has also called attention to the occurrence of gengrene of the vulva and vagina in enteric fever. Gangrene is seldom seen until near the defervescence of the disease.

Haemorrhage may occur during the attack. Its frequency from the nose and intestines has already received mention. It seldom occurs from the gastric vessels.

N E R V O U S S Y S T E M.

Acute meningitis is somewhat a rare complication of enteric fever. Hoffmann reports only 4 cases of acute meningitis in 250 post-mortems. Both he, Murchison, and the older writers believe that when meningitis occurs it is secondary to pyaemia or disease of the middle ear, or a tuberculous process. Keen, however, is of the opinion that menigitis is not infrequent in this fever, and that that it is often due to infection by the typhoid bacillus. He has collected a series of 15 cases and in all Eberth's bacillus was found - in 12, in pure culture. Keen thinks that cases of cerebral meningitis are often overlooked by reason of the fact that the head is frequently not opened in typhoid autopsies unless the cerebral symptoms have been very pronounced.

General Convulsions are not common, but occasionally do occur. Although a very grave symptom, they are not invariably fatal. Recovery took place in four of the six recorded by Murchison

They are not always associated with albuminuria. In only one of the four of Murchison's cases in which the urine was examined was it present.

Various forms of paralysis are occasionally observed after enteric fever. According to Murchison paralysis does not supervene until after the commencement of convalescence. It may last for several weeks or months, but recovery in the majority of instances eventually takes place. According to Nottinagel, the most common form of paralysis is paraplegia, but it may also take the form of hemiplegia, strabismus, paralysis of the portis dura, or motor paralysis of the individual spinal nerves, such as the ulnar or peroneal.

Aphasia usually accompanies a right hemiplegia. Peripheral neuritis may sometimes be a sequel. Local neuritis is seen in the arms and legs by no means infrequently. Multiple neuritis may be seen in the same regions.

Muscular tremors have already been alluded to as common symptoms. Tender toes have been described by Osler and Handford as occasional sequels. Tetany sometimes appears during the convalesvence, very rarely during the first week of the fever.

Chorea has been seen by Holtoften in this disease more often than any other infectious fever. Epilepsy is very seldom encountered at any stage of the illness.

The interesting condition known as "typhoid spine" has been described by Gibney. He regards it as a perispondylitis or acute inflammation of the spinal periostecum and attached ligaments .

Mental affections may follow enteric fever, especially when the attack has been protracted and severe. Imbecility or stupidity may occur and persist for months. Melancholia is perhaps the commonest form of mental derangement. The pateint may suffer from attacks of mania, which may be of a very violent kind. Such persons are usually of a hereditary neurotic taint. Insanity may result from the nutritional disturbance consequent upon nervous exhaustion and insufficiency of food during the fever. All but maniacal cases usually recover, though slowly.

O R G A N S O F S P E C I A L S E N S E.

E A R .

Acute otitis media somewhat frequently complicetes enteric fever, and especially in hospital practice . In Hengst's collection of 1,228 cases of typhoid it was present in 28, that is

2.25 percent. It usually developes from the end of the second to the fourth week. Hengst believes that the mode of invasion of the middle ear is by extension of the catarrhal inflammation from the nasopharynx through the Eustachian tube, though it is possible that occasionally the process is caused by cold daughts of air on the side of the head, or by the entrance of cold water into the ear when the patient is being bathed. Purulent otitis media is probably always of microbic origin. Many varieties of bacteria have been found, either alone or in association . The pyogenic streptococcus and staptylococcus are the most common, but the diplococcus of pneumonia, the bacillus of Friedländer, and the bacillus typhosus are also sometimes present. Mastoiditis developed in 1 of Hengst's 28 cases. All the cases ended in recovery, no chronic otorrhoea or deafness resulting. Keen has collected 31 cases of otitis complicating enteric fever, making a total of 59 when added to those of Hengst. Although this complication is most frequent in severe and protracted cases, yet none of the 59 died.

EYE The ocular complications of enteric fever arenumerous. The following are the most important; Paralysis of the External ocular muscles; catarrhal conjunctivitis, suppurative keratitis; phlyctennular conjunctivities and keratitis; iritis and choroiditis; cataract; retinal haemorrhages; and optic neuritis.

DIGESTIVE SYSTEM.

Pharyngitis, catarrhal or diphtheritic, occurs in a large number of cases, and frequently gives rise to great difficulty in swallowing. Indeed it has been so frequently observed in some epidemics that certain authors regard it as a symptom rather than a complication of the disease.

Keen refers to a case of acute glossitis. At most it appears to be an extremely rare complication.

The same remark applies to noma or gangrene of the mouth, which is a very fatal disease. Murchison only saw it once, and Griesenger in one case of six hundred typhoids.

Parotitis occasionally occurs in enteric fever, but is much less common than in typhus. It is most frequently met with in bad cases about the end of the third week or later, and generally involves one side only. The swelling is hard and firm in the beginning, and may terminate in resolution or suppuration . Muchison saw it in

only 6 cases, 5 of which were fatal. According to Hoffmann, 16 cases of suppurative parotitis were found at Basle among 1600 enteric fever patients, 7 of the 16 ending fatally. Parotitis without suppuration occurred three times. In 15 cases the attack was confined to one side, 9 times to the right and 6 to the left; in 4 it was double. Trousseau (Clinque Méd. de l'Hotel Dieu, t. i, 1861) takes a very gloomy view of parotitis, and says that he has scarcely ever seen a case recover in which it has occurred, either in the course of enteric fever or any other disease. On the other hand it is regarded as critical and favourable by Chomel. In two of Keen's cases, the bacillus typhosus was fund; in one case it was associated with the staphylococcus, but in the other Eberth's bacillus existed alone.

Ulceration of the oesophagus sometimes occurs. It usually causes no marked symptoms. In two cases Keen saw stricture follow.

Gastric ulcer occasionally occurs, but seldom gives rise to characteristic symptoms, its presence being discovered usually after death. Keen says haemorrhage from such ulceration seldom occurs without ulceration.

Haematemesis is a rare complication of enteric fever. Murchison and the older writers do not even mention it. Osler saw it three times only in a large experience.

Perforation of the Intestine. This is the most important and the most dangerous of all the complications of enteric fever. It is fortunately not of frequent occurrence. Murchison observed it 48 times in 1.580 cases, Griesenger 14 times in 118 cases, and flint twice in 73 cases. Murchison found that in a total of 1721 autopsies, the details of which were collected from various sources, it was the cause of death in 176 , 11.38 per cent. Schultz found that intestinal perforation took place in only 1.2 per cent. of 3. 686 cases treated in the Hambourg Hospitals during the years 1886 and 1887. Hölscher found perforation in only 6 per cent of 2.000 cases, and Fitz, in 4.680 fatal cases collected from various sources, found it present in 6.58 per cent. Keen's findings have approximated by those of Fitz very closely.

Perforation takes place most frequently during or after the third week of the disease, It may, however, occur as early as the first week, or as late as the sixteenth, as well as be seen by

the following tabular compilation by Fitz;

Date of occurrence of Perforation.

Week	Cases	Per cent.
First	4	
Second	32	16.5
Third	48	24.8
Fourth	42	21.7
Fifth	27	14.0
Sixth	21	13.4
Seventh	5	
Eight	3	
Ninth	2	
Tenth	4	
Eleventh	3	
Twelfth	1	
Sixteenth	1	
	193	

Perforation is much more frequently met with in men than in women. The reason for this is unknown. Of 444 cases tabulated by Fitz, 71 per cent. were in men and and only 29 per cent. in women. The patients were men in 51 of 73 of Murchison's cases, and in 72 of 106 cases collected by Näcke. It is extremely rare in children. Rilliet, Barthez, and Taupin met with it only three times in 238 children under treatment. Murchison has, however, had a fatal case in a child of five years of age. Fitz in 192 collected cases found it to have occurred only seven times in children under ten. The mildness of enteric fever in childhood probably accounts for its rarity at that period.

Perforation usually occurs in the lower portion of the ileum - in 82.4 per cent. of the cases, according to Fitz and Hawkins (in 197 or 239) In 25 cases the opening was in the colon, in 8 cases in the vermiform appendix, in 7 cases the caecum, and in 2 cases the jejunum. Keen has found the colon most frequently perforated, and in its sigmoid portion, and when he finds no ppening in the ileum, caecum, or appendix, he invariably submits the sigmoid flexure to a searching examination. Two or more openings exist ed in 29 or Fitz's 167 cases. Usually, however, the perforation is single.

Perforation occurs most frequently in severe cases of enteric fever, and has been preceded by symptoms of great gravity, such as severe diarrhoea, great ty mpany, and abdominal tenderness, and intestinal haemorrhage; but in a certain

number of instances the cases in which it has occurred have been of a mild character, the patient in many of them not considering himself sick enough to take to his bed, or even to abstain from his daily labour.

Perforation is favoured by the irritation arising from indigestible and unwholesome food, distension of the bowels by faeces or gas, vomiting and movements on the part of the patient. Murchinson refers to a case of Morin's in which the perforation was produced by the administration of an enema, and states that he could cite many instances in which the injudicious exhibition of purgatives had given rise to it.

The symptoms of perforation being due to the resulting peritonitis are usually easily recognised. The accident may, therefore, be suspected when the patient is suddenly seized with acute pain in the abdomen, accompanied by signs of collapse and occasionally by rigors. The fall of temperature is often considerable -- it may be five degrees, or more. Very soon the abdomen becomes tender on pressure, and, if it were not so before, hard and tympanitic; the pulse grows frequently small, and sometimes almost imperceptible; the breathing is thoracic; the countenance expresses great suffering; the features are contracted; and the face is bathed in profuse perspiration. Nausea, and vomiting come on soon after inflammation. has commenced, and rapidly exhaust the patient. The decubitus is dorsal, and the legs are generally drawn up so as to relax the abdominal muscles. Prostration rapidly increases until death puts an end to the patient's sufferings. Occasionally the symptoms are more obscure. Pains and rigors may both be wanting, and nothing but extreme prostration, the frequent and feeble pulse, and the distended condition of the abdomen will indicate the gravity of the danger. This is not infrequently the case in delirious patients. Death may take place during the collapse, but this is rare. It more frequently takes place on the second or third day; on the other hand, it may be postponed until much later. Murchison refers to cases in which there was an interval or two or three weeks between the first symptom of perforation and the termination in death.

Perforation is almost invariably fatal, and that, too, sometimes within a few hours. Murchison lost sixes cases twelve hours after the symptoms began. Of 134 cases collected by Fitz, 37.3 per cent. were fatal during the first week following the onset of the symptoms; during the second week

9 patients died; 4 during the third week; 1 lived thirty days; and another thirty-eight days. In rare instances recovery has been reported by physicians whose skill in diagnosis is universally recognised. Thus, Murchison reports six cases, Tweedie two, and Ward one. Bristowe (Trans. Bath. Soc., vol. xi, p. 115.) and others also say that recovery is possible. This view is sustained by the result of certain autopsies. In one of these, reported by Buhl (cited by Murchison) a perforation, was found completely closed by adhesions to the mesentery, and in others reported by Murchison partial adhesion had taken place between the edges of the perforation and the abdominal walls or to an adjoining coil of intestine. Occasionally, the inflammation excited by the perforation may be circumscribed and terminate in an abscess, which may permit recovery by discharging itself into bowel or internally.

Peritonitis is of all complications of enteric fever the most serious. As stated, its most common cause is perforation, but it may be due to the extension of inflammation to the peritoneal membrane without ulceration. It is believed sometimes to occur as a result of the typhoid infiltration, so frequent in various tissues of the body taking place in the serous membrane. In other cases it arises from the rupture of softened mesenteric glands, of softened infarcations in the spleen, or of the abscesses which are sometimes the consequence of the circumscribed inflammation by which perforation is occasionally prevented from proving immediately fatal. Less frequent causes of it are rupture of the gall-bladder, with the escape of gall-stones into the abdo minal cavity, abscss of the ovary, and abscesses in the walls of the urinary bladder. Murchison once saw it result from the bursting inwards of an abscess in the sheath of the rectus abdominis muscle.

Jaundice is a rare complication of enteric enteric fever. Griesinger saw it only ten times in 600 cases. Hoffmann found it in 10 of 250 fatal cases, and Murchison was able to collect 9 cases, all of whic h but one ended in death. Several of Griesenger's cases, however, recovered. Osler classifies the cases of jaundice in enteric fever into four groups; (1) catarrhal; (2) toxic; (3) those associated with abscess of the liver; and (4) those associated with gall-stones and cholangitis. Catarrhal jaundice is usually an early and transient symptom and has no influence

upon the course of the disease.

Affections of the gall-bladder and abscess of the liver are rare both as complications and sequesl of enteric fever.

The same may be said for abscess of the spleen. Keen was only able to collect nine cases.

G E N I T O U R I N A R Y S Y S T E M .

Acute nephritis is seldom seen in enteric fever; it appears occasionally during the continuance of the fever, the urine is heavily loaded with albumin, and usually contains some blood; tube casts are found in the sediment, covered with epithelium, or frag ments of th e same, the secretion of urine is sometimes scanty, and a moderate degree of dropsy sets in, frequently beginning in the hands and face. The prognosis is usually good, the patients generally recover, and the nephritis subsides.

Pyuria has been seen ten times by Blumer. Osler says it is not uncommon in enteric fever. The former regards it as a complication devoid of intrinsic gravity.

Haematuria is seen in severe cases, and is usually recovered from. Both it and haemoglobinuria are usually associated with renal disease.

Cystitis frequently attends the use of an unclean catheter, and resolves upon removal of the caus.

Pyelitis has been seen by Osler in three cases. It is of exceptional occurrence.

Urethrites may arise during convalescence, and apart from venereal affection is favourable.

During the convalescence male patients may suffer from orckitis or epididymitis, without the previous existence of gonorrhoea. Keen has collected 32 cases, and points to mixed infection of Eberth's bacilli and pyogenic microbes as the cause.

The same observer mentions four cases of ovarian abscess, from the pus of which the bacillus typhosus was obtained in pure culture.

Gangrene of the genital organs is more common in women than men. Both penis and scrotum are apt to undergo destruction (Keen, Fournier), and other parts according to sex.

Sometimes menstruation occurs prematurely during enteric fever, and may be profuse. It appears to be without effect tpon the course of the disease. The function may be in abeyance for several weeks during the convalescence.

Pregnant women may suffer abortion or miscarriage. Of 14 pregnancies observed by Murchison all but two aborted or miscarried, and four died.

OSSEOUS SYSTEM.

Arthritis occasionally occurs in enteric fever. Keen recognised three forms; (1) rheumatic typhoid arthritis, (2) septic typhoid arthritis, and (3) typhoid arthritis proper. The first and second varieties are rare and are usually polyyarticular. The first may end in a multiple ankylosis.

Periostitis is an occasional sequel of enteric fever. Sir James Paget (St. Barthol. Hosp. Rep. vol xxi.), who saw several cases of it, says that it never occurs in the continuity of the fever, but always when the patient is apparently convalescent, when his temperature is normal and constant, and he is beginning to move about and to grow stronger and stouter. Its most usual seat is the tibia, but it is also met with in the femur, ulna, and parietal bone. Except in one case, he has never seen it in more than one bone in the same person. It is always circumscribed with a space of one of three inches in extent, and usually subsides without necrosis or other lesion; but in such cases the patient has remained for some time subject to repeated attacks of pain and swelling of the periosteum. In a few cases, he says, in which periostitis is followed by necrosis the extent of dead bone has always been less than that of the inflammation over it. Murchison, however, refers to two cases of necrosis of the tibia, to one of the temporal bone, and to two in which extensive necrosis of the lower jaw occurred. Gay (Trans. Pathol. Soc., vol. xx, p. 290) also reports a case of extensive necrosis of the femur in a child three years old, following an attack of enteric fever. Speaking of the date of onset of necrosis of bone disease in typhoid patients, Keen mentions that in 16 cases it occurred in the first two weeks; in 66 from the third to the sixth week; and in 10 months and years after the fever. Regarding the various forms of bone disease, Keen gives the following series for 1896:

Necrosis.....	35 Cases
Caries.....	1 case
periostitis.....	107 cases
Osteitis (bone abscess)..	12 "
Osteomyelitis.....	10 "
Granuloma.....	2 "
Exostosis.....	1 case.
	168 Cases.

In the majority of cases the typhoid bacillus was found in pure culture, in the remainder there was a mixed infection with pyogenic cocci

S K I N C O N N E C T I V E T I S S U E, M U S C L E S.

Furuncles and abscesses. in the skin, in the subcutaneous cellular tissue, in the muscles and the fascia beteen them, are frequently met with, most commonly at a late period or during convalescence They are most readily developed at such points as are subjected to continuous or frequent pressure, as the back and buttocks, and may, under some circumstances, prove to be the beginning of bed-sores. Muscular abscesses are most frequent in the region of the glutei and calf muscles, less so in other regions.

Bed-sores at one time were among the most common and dreaded sequels of enteric fever. Now, however, they are much less frequently encountered. They arise in consequence of the impaired nutrition of the tissues, the length of time the disease lasts, and the great emaciation which usually attends it. They constitute a very serious and troublesome complications, and may occur on any part of the body subjected to pressure, but are most frequently seen over the sacrum and the trochanters.

Gengrene of the skin occasionally occurs at points that are free from pressure, where the circulation is defective.

Rupture of the muscles occasionally takes place in consequence of the friability of the muscular tissue resulting from degeneration of the same. It is oftenest seen in connection with the abdominal muscles, and is often accompanied by haemorrhage. It may give rise to no symptoms or end in suppuration and death from septicaemia.

Falling of the hair is one of the commonest sequels of enteric fever, and may be considered

the rule in severe cases. It usually takes place from the fourth to the eight week of convalescence, and before it is complete the new hair begins to grow.

R E L A P S E S.

Authorities appear to be at variance regarding the frequency of relapses in enteric fever. According to Gerhardt they occur in 6.3 per cent. of the cases; Bäumler found them in 11 per cent, and Biermer in 3.3. per cent. Murchison noted their occurrence in 80 of the 2.591 cases in the london fever Hospital, or in 3 per cent., and Maclagan in 13 of the 128 cases. at Dundee, or in 10 p er cent. Innermann 'Schweiz. Corresp. Bl., viii,1878) says they occur in15 per cent. of the cases , and that in very unfavourable cases the proportion may be as high as 18 or 19 per cent. Henoch (Charité Ann, ii, 1875) observed relapses in 16 cases out of 96, or 16.6 per cent. Part of this difference of opinion in unquestionably attributable to the fact that under the term relapse are sometimes included two distinct conditions; (1) Where recrudescences of fever, which occur during the stage of defervescence or that of convalescence, and which are provoked by errors of diet, mental or bodily fatigue, or some other irritating cause. The usually last a day or two, and are entirely distinct from (2), true relapses, in which all the characteristic symptoms of the primary attack are reproduced, which commonly occur some time after the disease has apparently run its course. There is occasionally no distinct apyretic interval between the two attacks, but in by far the greater number of instances the relapse occurs in the second or third week or even later, after the establishment of convalescence. In 20 cases reported by Ord and Seymour Taylor (St. Thomas's Josp. Rep., vol. ix, 1879) the relapse occurred in the third week of the disease in 1; in the fourth week in 5; in the sixth week in 3; in the seventh week in 7; in the eight week in 3; in the ninth week in 1; The duration of the relapse is usually shorter than that of the original attack. In Murchison's cases, the average length of the first attack was 26 .6 days, that of the relapse 15 days. Inonly 5 of the 51 cases the relapse was longer than the original attack of the disease.

The onset of the relapse is generally more abrupt than that of the original attack. It is rarely preceded by prodromata. The te mperature rises more rapidly and attains its maximum earlier, which may be much greater than in the original attack. Thus, it may reach 105° on the evening of the first day, and temperatures of 103° 5° and

104° on the evening of the second day are not infrequently encountered.

The characteristic-rose-coloured eruption appears earlier as a rule , but, according to Jaccoud, is usually not so abundant as in the first attack. Of 38 cases analysed by Murchison, the rash appeared on the third day in 7; on the fourth in 8; on the fifth in 7; on the sixth in two; on the seventh in twelve; and at a later date; in 2. The delirium also comes on sooner. The relapse is usually less severe, and is of shorter duration, than the primary attack. The relapse usually terminates in recovery, but this is not always the case. Of Murchison's 53 cases , 7 were fatal; in 2 of the cases death was due to perforation; in 2 to peritonitis, induced by spleenic infarcation; and in 1 to abortion. Of Ebstein's 13 cases, 3 were also fatal. Occasionally a second, and it is said even a third , relapse is noted . Da Costa has twice seen five relapses. In one of his cases, during a second relapse, the patient succumbed to intestinal haemorrhage.

Many explanations have been forthcoming to account for these relapses. They arise from a reinfection with the typhoid poison, and it is generally believed that the second infection is from within the body, not from without. The clinical phenomena are accompanied by a renewal of the lesions of the intestine, and in post-mortem examination in fatal cases the recent lesions of the relapse are usually found lower down in the bowel, than the cicatrising ulcers of the original attack. Nothing satisfactory regarding the etiology of relapses has been discovered. Hamernjk and Maclagan allege that relapses are due to inoculation of the healthy Peyer's patches by the sloughs thrown off by those first affected, and favoured by constipation, but this is opposed to the experience of almost everyone who has paid any attention to the subject. It is more likely , however, as suggested by Liebermeister, that part of the Typhoid poison remains latent somewhere in the body, not developed, destroyed, nor expelled during the first attack, but brought later into activity by some exciting cause. This view has received confirmation by Dupré and Chiari, who found the typhoid bacilli in the gall-bladder of patients suffering from enteric fever.

ASSOCIATION WITH OTHER SPECIFIC DISEASES.

The fact of a person suffering from enteric fever does not hinder him from taking another infectious disease, either during the actual attack or in the convalescence. The following diseases may be noted in this connection; Measles, variola, varicella, malarial fever, diphtheria, scarlet fever, pertussis, typhus fever.

V A R I E T I E S.

Numerous indeed are the forms of enteric fever described by various authors, but as many of them present but few points of difference from the usual form of the disease, it will not be necessary to discuss them at any length. They derive their names from some peculiarity of the mode of seizure, from the prominence of some one symptom or set of symptoms, or from the presence of complications. They are;

(1) The adynamic form, in which prostration is marked in the beginning and throughout the attack.

(2) The ataxic or nervour form, which is characterised by the predominence of delirium, subsultus tendinum, and other nervous symptoms.

(3) The haemorrhagic form, in which there is a special tendency to haemorrhage fro m the different mucous membranes.

(4) The abdominal form, in which the abdominal symptoms, such as diarrhoea and tympanitis, are well developed.

(5) The thoracic form, so called from the presence of some thoracic complication.

(6) The gastric or bilious form, in which the disease is complicated at its commencement by gastro-intestinal catarrh (la forme muqueuse of French authors).

(7) The acute form, in which the disease begins abruptly and with great violence, and runs a very rapid course, terminating usually in death before the end of the first week or early in the second, before ulceration can have taken place. Delirium is an early and prominent symptom in this variety, so that it has sometimes been diagnosed as meningitis.

The following forms of enteric fever, however, merit fuller consideration;

The mild Form - The general nature of the attack is indicated by its name. It is so light and rudimentary as often to escape recognition. But the spleen is enlarged, and a careful search

will discover the rose-spots. The fever seldom exceeds two weeks and is of moderate height. Griesinger designates this variety "typhus levissimus." The Widal test affords great assistance in the diagnosis of these somewhat doubtful cases.

The Abortive Form- In this variety of enteric fever, the disease is, as its name implies, cut short in its course. There is every reason to believe that infiltration of Peyer's Patches takes place as usual , but that the subsequent course of the disease is different, the glands undergoing resolution instead of advancing to ulceration. The majority of observers agree that in the beginning there is nothing to distinguish such attacks from those which follow their usual course. Jaccoud states, however, that their commencement is usually more abrupt, than in the ordinary variety. Various observers assert that the temperature generally reaches its maximum earlier. They are occasionally characterised by severe symptoms, including a high temperature. The latter usually falls gradually , but sometimes the fever ends abruptly and with profuse perspiration. Griesinger has seen defervescence occur as early as the fifth day.

The Afebrile Form- This form of enteric fever is very rarely seen, and is distinguished by the insignificance of the fever or the entire absence of it. Liebermeister was perhaps the first to assert that enteric fever could run its course without pyrexia. He often noticed this in Basle, the cases showing all the symptoms of the disease except pyrexia. Many of the patients were confined to their beds for four weeks or even longer. He regards these cases as the result of a minimum infection, due to the widespread distribution of the typhoid poison in Basle. Cayley (Croonian Lectures, 1880) also refers to cases, and even epidemics , of enteric fever in which the temperature has been below the normal throughout the whole course of the attack. Strube (cited by Cayley) had the opportunity of observing such an outbreak during the siege of Paris by the Germans in 1870. "In many of the cases," he says, "the temperature throughout was subnormal, and in others never exceeded the normal point. The roseola was usually profuse; the nerve symptoms were of marked severity, and were in inverse ratio to the temperature, consisting of delirium alternating with stupour; the duration of the fever was very short, defervescence usually taking place at the end of a fortnight. Of the 23 fatal cases, in 20 death took placeduring the first fourteen days.

The abdominal symptoms were slight , but the characteristic lesions were found on post-mortem examination. All the cases were characterised by great prostration. These cases presented some features which were probably due to the peculiarity of the temperature; thus, the pulse was but little accelerated, seldom exceeding a hundred; the tongue did not become dry and brown; and the enlargement of the spleen was either absent or much less marked than usual." Strube attributed the peculiar features of this epidemic to the depressed condition of the troops; they had been exposed to great hardships on the way to Paris, overfatigued by forced marches and insufficiently supported with food.

The Latent or Ambulatory Form- This form - the typhus ambulatorius of the Germans, or "walking typhoid" -- is of more importance from the fact that the symptoms are so mild, or that so many of the ordinary symptoms are wanting or masked by those due to complications, that there is great danger of regarding the attack as of little moment. In many cases there is no symptom present but prostration and fever to indicate the patient is ill, and these may be so slight that he may positively refuse to go to his bed, and may even insist upon pursuing his ordinary avocations, in the midst of which he is often suddenly seized with alarming symptoms, such as violent delirium, intestinal haemorrhage, or, what is more common, thosedue to perforation of the bowel, Still, even in these cases a careful examination will often disclose the presence of some symptom which had failed before to attract attention, and which will often reveal the true nature of the disease.

ENTERIC FEVER IN CHILDREN.

It was formerly thought that children were not subject to the disease, which is now known to be common in childhood, though rare in infancy. The rose-spots are more often apt to assume a distinctly remittent type; and hence, no doubt, the difficulty which is often experienced in distinguishing typhoid from other forms of fever in children. There is no question but that many cases have been described by authors under the head of "infantile remittent fever" are really examples of enteric fever modified simply by the age of the patient. It may ~~never~~ occur in infants not more than six months old, and is not infrequent in children of two or three years of age. Henoch (Charite Ann., 1875), who has had the opportunity of observing a large number of cases, says that the rise of temperature is commonly more abrupt in children than in adults, and that the disease generally runs

its course in a shorter time. The pulse is more frequent, and may be as high as 144 in cases in which the prognosis is not grave. Dicrotism is very rare. Slowness and irregularity of the pulse, like that observed in basillar meningitis, he has never seen. The nervous symptoms are not so pronounced even when the temperature is high. The stools may be brownish or greenish, instead of yellow, and diarrhoea is frequently absent during the whole course of the disease.

ENTERIC FEVER IN THE AGED.

The disease appears to be rare in persons over 50 years of age. It occasionally occurs, however, at very advanced ages. Of 5.911 cases at the London Fever Hospital, 27 patients were over 60 years of age and two above 75. Trousseau observed a case in a patient 64 years of age, Wilks one at 70, Lombard one at 72, Heulard d'Arcy one at 86, Hamernyck one at 90, and Gueneau de Mussy one at 100 years of age. In aged persons the febrile movement is generally prolonged, although of a low grade, the temperature rarely rising high, and frequently during convalescence sinking below the normal. The diarrhoea is commonly not so severe, the delirium so violent, or the rose-spots so often present as in younger persons. On the other hand, adynamic symptoms, such as excessive prostration, tremors, subsultus tendinum, and the like, are frequently prominent from the beginning of the attack. Such patients frequently collapse from heart failure. The mortality is placed by Uhle at 50 per cent.

DIAGNOSIS.

During the first week the insidious invasion of enteric fever, together with the absence of pathognomonic symptoms, always renders the diagnosis difficult, and sometime impossible. Still, even, at this time the existence of the disease may be suspected if the frequent use of the thermometer reveals from day to day a gradual increase of the fever and the existence of evening exacerations followed by morning remissions, the temperature rising each evening from a degree to two degrees higher than it had done the previous evening. If in

addition to this character of the pyrexia there are diarrhoea with ochrey - yellow stools, or an increased susceptibility to the action of aperient medicines, epistaxis, emlargement of the spleen, slight fulness of the abdomen, with tenderness and gurgling in the right iliac fossa, slight lebitude and some confusion of ideas on awakening, the diagnosis becomes probable. During the next week the symptoms are generally characteristic . The presence of marked abdominal symptoms, together with the appearance of the rose-spots, will generally render therecognition of the disease at this time an easy matter. There are, however, a few cases in which no rose-spots can be found, and in which the abdominal symptoms, if they exist at all, are so little marked that they escape notice. Even in these cases the temperature chart, when carefully studied, will often throw a good deal of light upon the nature of the disease. If the febrile movement resembles that usual in enteric fever, if it has continued for more than a week, if the patient has not been recently exposed to influences other than typhoid, and presents no symptoms of local disease, the diagnosis may still be made with at least an approach to certainty in most cases.

SERUM DIAGNOSIS.

The agglutination reaction was first suggested in 1896 by Widal for the diagnosis of enteric fever. The history of the discovery and the researches of others leading up to it, though interesting need not be dwelt upon here. It was at first thought that the mere occurrence of agglutination , produced by an addition of serum to a vigorous culture of typhoid bacilli, was sufficient to prove that the person from whom the serum was derived was, or had been, suffering from enteric fever. It was, however, soon discovered that the serum of normal persons may produce this effect, if it be added in sufficient strength of dilution of the serum to one part in ten the next adopted as the standard, but this again was found unsatisfactory. Then a 1 : 20 standard was substituted . For practical purposes this dilution is of considerable value, but it is now recognised that no absolute diagnosis can be made as to the existence of enteric fever on a positive reaction occurring with a less dilution than 1 : 30 , or even 1 : 50. With the stronger mixtures a time-limit of half an hour is necessary with the weaker the time of observation may be prolonged to two hours. Libman (Med. News. Jan. 30,

1904 , p. 204) has succeeded in obtaining a positive reaction in as high a dilution as 1 : 50 when it is not present in more concentrated mixtures as 1 : 20. In testing he therefore always uses two dilutions each time.

For the performance of the test either dried blood or the serum obtained from a blister may be used. The serum can be more accurately diluted than the blood and is therefore preferred for examination, but in practice the dried blood has been found to answer all the purposes of the test. The blood may be taken from the lobule of the ear or the tip of the finger, the usual antiseptic precautions being observed. The blood is collected in capillary tubes, or in a glass bulb drawn out at either end into a fine point; the ends being sealed in a flame afterwards. Coagulation takes place in the tube, and the serum which exudes from the clot is used for the test. There are several ways of securing the necessary dilution of the serum, For the greater dilutions at least it is best to use a graduated pipette. Sterile broth is used for the purpose, but some prefer normal salt solution The culture must be a recent and vigorous one, in which the bacilli are in active movement. In older cultures an agglutinating substance is formed by the bacilli and diffuses out into the liquid ; in such specimens the bacilli are found to have become clumped without the addition of any extraneous material, and are consequently unfit for use. When the dilution has been made, a drop of the mixed fluid is placed on a cover glass, and a hanging drop preparation is made and observed under the microscope. The cover glass should be ringed found with vaseline to prevent evaporation. A low power of the microscope will be sufficient to show, if true agglutination of the bacilli takes place, that almost all of them have run together into masses, while any that remain free have lost their motility, and remain at rest. It is even possible to do the test macroscopically by mixing the serum and culture in a test-tube or watch - glass. If the reaction occurs there will be a precipitate , and according to Berliner, and Cohn (Münich. med. Woch., Sep. ii, 1900) an asteroid arrangement in half an hour.

According to McWheeney (Dublin Jour. Med. Sci., Sep., 1898) the test can be performed by growing the bacilli in hanging drops, one with the serum to be tested, the other with the normal serum. (The serum is added in the proportion of 1 per cent. and the slides are kept at 37.C.) If the reaction is positive, the bacilli in

this drop will be seen to form chains and to be non-motile, whereas in the negative experiment they are freely motile and separated.

A very precise and graduated quantitative test has been devised by Hewlett and Rowland (Brit. Med. Jour., April, 28, 1900), who recommend that the serum be received into capillary tubes, of which the thickness of the walls and the diameter of the lumen may be measured microscopically, and the length of the column of serum ascertained. In this way the exact volume of serum is calculated. Subsequent dilution is effected by measured proportional amounts of broth.

Meyer (Berl. klin. Woch., 1904. p. 166) and Ehrsam (Munch. med. Woch, 1904 , p. 662) speak very highly of the method of Ficker (Berl. klin. Woch. 1903, p. 1.021, which aims at the performance of the test with dead bacilli, specially prepared and suspended in an indifferent fluid. The serum to be examined is diluted , 1 : 10, with saline solution and mixed with the slightly turbid test fluid. If the reaction is positive the mixture becomes clear, a slight precipitate falling to the bottom; ten to fourteen hours being required for the reaction to take place.

There can be no question as to the value of the serum, test in the diagnosis of enteric fever. It is, however, not an infallible sign, nor is it always an early sign of the disease. Reviewing the published reports of a large number of observers, it appears that the results of the tests are in accord with the clinical diagnosis of about 95 per cent. of the cases. In the other 5 per cent. the reaction has not appeared. The absence of the reaction, therefore, in any individual case does not exclude the diagnosis of enteric fever. Often it is not present until the diagnosis has already been made from the clinical phenomena of the disease.

DETECTION OF TYPHOID BACILLI IN THE STOOLS AND URINE

Mentinn has already been made of His's detection of the bacilli, in the stools of 90 per cent. of his cases, during the febrile stage of enteric fever; and that, too, often when the Widal reaction have negative results. The specific bacilli was less frequently found in the urine, but they are sometimes seen there as early as the fourth day of the illness.

D I F F E R E N T I A L D I A G N O S I S.

The following are the diseases which are most like to be mistaken for enteric fever ;

Typhus fever has a course which is so essentially different from that of enteric fever that in well-marked cases it would scarcely be possible to mistake one for the other. Cases do occur, however, in consequence of a very profuse and dark-coloured eruption in the latter, or of the existence of abdominal symptoms in the former, present at first a good deal of difficulty in diagnosis. The invasion of the former is more abrupt and its duration shorter than in enteric fever. The eruption is usually more copious, and appears in the former as early as the fourth, fifth, or sixth day, while that of the latter is rarely observed before the seventh day. The fever of the former is much more nearly continued in type than that of the latter. Defervescence occurs in the former by crisis; in the latter by lysis. The expression of the face is different in the two diseases. In typhus there is a uniform dusky hue of the face, with injection of the conjunctivae, and contraction of the pupils. In enteric fever the pupils are often widely dilated, the conjunctivae clear, and the face pale, with the exception of a circumscribed flush on each cheek. Diarrhoea is much less freequent in the former than in the latter, and when it does occur is not accompanied by "pea soup" stools. Epistaxis, tympanitis, pain, and gurgling in the right iliac fossa, and intestinal haemorrhage, common symptoms in the latter, are very infrequently met with in the former. On the other hand, petechiae and vibices, which are of almost constant occurrence in the former are rare in the latter. The circumstances also under which the two diseases are contracted are different, and the character of the prevailing epidemic is helpful in their differentiation.

Influenza occasionally resembles enteric fever. The following symptoms are common to both affections; fever attendant with weakness, sleeplessness, delirium, sweating, sometimes diarrhoea; pulmonary catarrh, deafness, epistaxis, and dry redtongue are likewise seen in both. The differential diagnosis rests chiefly upon the occurrence of influenza in widespread epidemics, the short duration of the attack, the atypical temperature - curve, and the absence of the eruption. and the abdominal symptoms that are usually associated with the diarrhoea of enteric fever.

Simple continued fever may readily be mistaken in the beginning for enteric fever, especially in those cases attended by diarrhoea, but, as a general rule, the different character of the febrile movement, its more abrupt commencement and termination,

and its shorter duration, together with the absence of the rose-spots, will usually serve to distinguish it.

Acute general miliary tuberculosis may readily be mistaken for enteric fever owing to the similarity of symptoms. The chief points of difference are these; In enteric fever the temperature-range is typical or more or less conformed to a definite type, whereas that of acute tuberculosis is extremely irregular. In enteric fever diarrhoea and some degree of tympany are common; in acute tuberculosis diarrhoea is rare and the abdomen is apt to be flat and often scaphoid. In enteric fever epistaxis and enlargement of the spleen occur; in tuberculous meningitis these symptoms are rare or absent altogether. The headache of enteric fever is dull, while that of tuberculous meningitis is acute and usually associated with intolerance of light and sound. In enteric fever vomiting is much less common than in tuberculous meningitis. Convulsions, especially in the early part of the disease, are likewise rare, and the headache of enteric fever disappears upon the occurrence of delirium (Jenner), whereas in tuberculous meningitis headache and delirium may alternate from the beginning. In tuberculous meningitis, moreover, tubercles will be seen in the choroid by the aid of the ophthalmoscope.

Tuberculous peritonitis may be mistaken for enteric fever when it is of gradual onset, but lencocytosis is present in this as in the other forms of tuberculosis - not in enteric fever, and the temperature is irregular, and may be subnormal.

Malarial fever and enteric fever are not infrequently mistaken for each other. The diagnosis of malarial fever is especially founded on the proof of splenic tumous, parasites in the blood, and melanaemia. Parasites and pigment, however, are not always to be found in the peripheral blood. In such cases the blood for examination must be extracted from the spleen by means of a Pravaz syringe with due observance of antiseptic principles. The presence of one single parasite in the blood confirms the diagnosis of malaria, and the absence of malarial parasites and the presence of the Widal reaction does the same for enteric fever.

Cerebro-spinal meningitis may be simulated by the cerebral form of enteric fever. The rarity of the former disease, as well as the fact that in it there is usually lencocytosis, whereas in enteric fever the blood gives the Widal reaction.

Appendicitis can be distinguished by the local

symptoms as contrasted with the constitutional ones of enteric fever. Furthermore, the onset in the former disease is more abrupt, the pain and tenderness in the right iliac region are more acute than in the latter, and in place of gurgling in this region there is a sense of resistance or tumour, on pressure, as well as dulness on percussion.

P R O G N O S I S.

OF THE SYMPTOMS.

In enteric fever the prognosis should always be guarded, as accidents of a fatal character frequently occur in cases which are apparently progressing favourably, and, on the other hand, recovery has often taken place after all hope of it has been abandoned. But, although it is impossible to fortell with absolute certainty the result in any particular case, there are certain symptoms which furnish very important indications for prognosis, and the proper appreciation of which will generally enable us to arrive at a correct conclusion as regards the gravity of the disease. Prominent among these is the character of the pyrexia . A fever characterised by high temperature should always give ocasion for great anxiety. This is very fully shown by the statistics of the Hospital at Basle. Thus of those patients in whom the temperature did not reach 104° , only 9.6 per cent. died; in those in whom it reached or exceeded 104° , 29.1 per cent. died; and , finally, of those in whose axilla the temperature rose to or above 105° 8° , more than half died. Fielder (Deut. Arch . f. klin. Med., Bd. I, p. 534) also found in the cases observed by him that in those patients whose temperature had risen to or exceeded 106° , more than half died. According to Wunderlich (Eigenwarme, p. 300), at 106° 16° the danger is considerable, at 107° 06° the deaths are almost twice as numerous as the recoveries, and at 107° 24° and over, recovery is rare. Murchison has, however, known recovery to follow a temperature of 108° .

The prognosis is more unfavourable in enteric fever when the temperature is continuously high, and when the morning remissions are slight and wanting, than when the daily fluctuations are greater, even though the temperature may reach a higher point during the evening exacerbations in the latter variety than is attained at any time in the former. Occasional remissions , even if produced by drugs, or other remedies, are to be regarded favourably as they indicate that the fever tends to subside. A high morning temperature ought, therefore, to give rise to more alarm than a high evening temperature. The prognosis is grave when the morning temperature rises to 104° or is persistently above

103°. Murchison says that recovery is rare after a morning temperature of 105°. Fielder saw, with one single exception, all patients die whose temperature in the morning rose to or exceeded 106° 25°, while of those whose temperature in the morning rose to 105° 44°, even if only on one day, more than half died. Any marked deviation from the usual temperature range in the course of the fever is unfavourable. A rapid rise of temperature indicates increased danger: it may be due to the occurrence of a complication or of some other cause acting unfavourably upon the patient. A sudden and decided fall should excite even more alarm, as it is generally the consequence of a free intestinal haemorrhage. A temporary abatement of the fever, with amelioration of the other symptoms, occurring between the tenth and twentieth days, and giving rise to the hope that convalescence is about to commence, but followed by a return of the symptoms in an aggravated form is also unfavourable. Murchison, Chomel, Louis, and Bartlett regard such cases as almost hopeless.

The outlook is very unfavourable in cases in which coma or wild or violent delirium comes on early. A moderate amount of delirium, especially when it occurs at night, or upon waking in the moning, and is readily dissipated by attracting the patient's attention, or stupour which disappears when he is thoroughly roused, is not unfavourable. Insomnia, subsultus tendinum, carphology, slipping down in the bed, incontinance of urine or faeces, and retention of urine, are all symptoms of bad omen, as is also rigidity of the limbs. Excessive subsultus is especially unfavourable, as it is generally most marked in cases in which intestinal ulceration is extensive. The same may be said for meningitic symptoms, apoplectic accidents, epileptiform or general convulsions, Less dangerous, afain, are melancholic conditions, or other marked forms of mental disease, which appear in the couse of the disease or during convalescence. Extreme deafness, as it appears in mild as well as severe cases, is without significance.

The frequency of the pulse plays a prominent part in the prognosis, as a change in its character and that of the heart-beats is often the earliest indication of the approach of danger in enteric fever. The first change is usually a diminution of the intensity of the first sound of the heart. This is significant, as it is frequently the earliest premonition of cardiac failure, to which a large proportion of the deaths in enteric fever are due. A pulse of 120 and over, especially

if it is at the same time feeble, is also unfavourable . Intermittence of the pulse is another bad sign, especially if, according to Haymer, it ocuurs during the first week of the disease. In convalescence intermittence is not an unfavourable symptom. The prognosis is bad also in those cases in which, with excessive weakness of the pulse, there are other evidences of cardiac failure, as, for instance, congestion of the lungs, cyanosis of the surface, and coldness of the limbs. A very frequent pulse is not so unfavourable in a child as in an adult, or in a person of nervous temperament. Other unfavourable symptoms are a dry, brown tongue, excessive tympanitis with abdominal tenderness, severe diarrhoea, vomiting when it occurs late in the disease, intestinal haemorrhage, and colliquative sweats. The delusion sometimes observed in very severe cases, in which the patient declares that he is not ill, is a very bad sign, many authors, and among them Louis, asserting that they have never known recovery to take place after it has been manifested. Peritonitis is a very serious complication, whether due to perforation or some other cause. Still, it has sometimes been recovered from, and is, therefore, not invariably fatal.

On the other hand, favourable symptoms are a gradual decrease of the temperature with ~~the~~ increased morning remissions, moistening and cleansing of thetongue, a lessening of the delirium, and other nervous symptoms, reappearance of an intelligent expression, recognition by the patient of his friends and attendants, and a diminution of the diarrhoea. Cases in which constipation exists generally do well. A copious eruption is also regarded by many as a favourable symptom.

INDIVIDUAL PECULIARITIES: MORTALITY.

It is beyond question that the individual peculiarities of a patient exercise an extraordinary influence upon the course and character of the disease, and that to a great extent upon these peculiarities the prognosis in particular depends.

The influence of age is important. Thus, Murchison found that in a large number of cases the death-rate varied at different ages as follows;

Under 10 years the death-rate was

Under	10	years	the death-rate was	11.36	percent
From 10 to	14	"	" "	12.86	" "
" 15 to	19	"	" "	15.48	" "
" 20 to	29	"	" "	20.45	" "
" 30 to	39	"	" "	25.90	" "
" 40 to	49	"	" "	25	" "
Above	50		" "	34.94	" "

In the case of children, leaving out the first year of life, the prognosis is decidedly more favorable than with adults. The death-rate among children in the first year is high, especially among the new-born . Taking all the cases together , the mortality in childhood is decidedly lower than in adults, probably exceeding 1 per cent . The published statistics relating to infantile mortality are without value except as showing these general facts. Enteric fever, like all the occult infectious diseases, shows an extremely variable intensity in children, the severe cases, however, being the exception, rather than the rule.

Among the cases of enteric fever in individuals over forty years of age collected by Uhle, more than half proved fatal. Age, therefore, excercises a positive influence upon the mortality of enteric fever. Its influence is less decided in this disease than in tuyphus, in which the death-rate does not reach 4 per cent. until after the age of twenty, when it rapidly rises from 12.34 per cent. until it reaches 57.03 per cent. in patients above fifty years of age . The comparatively slight mortality of enteric fever among children is probably due to the fact, that the temperature is less often continuously high in them than in adults, and that while hyperpyrexia is frequently present, it is generally better borne and less likely to produce paralysis of the heart. It is also said that the intestinal lesions are not so severe, and the liability to complications and sequelae less marked, in childhood.

In the female sex the mortality from enteric fever appears to be somewhat greater than in the male. Thus, the mortality , according to Murchison, at the London Fever Hospital was about 1 per cent. higher among the female than among the male patients. Murchison regards this excess of mortality among the former as not arising from the influence of child-bearing upon the course of the fever , since , it is less decided at that epoch of female life than between the ages of five and fifteen.

The social condition of the patient is without influence, for not only are the rich as liable to contract enteric fever as the poor, but the disease is quite as fatal among them. Murchison

found from the statistics of the London Fever Hospital that the mortality is not greater among the destitute than among the better class of patients, and expresses the opinion that in private practice enteric fever is probably more fatal among the upper classes than among the very poor. Many other observers are of the same opinin.

All authors agree that the circumstances, whether the patient be fat or lean is of great influence upon the course of the disease. It is a well established fact, that when very corpulent individuals are attacked with enteric fever, the prognosis is very unfavourable, and the popular belief that stout persons are more endangered by the disease than weak ones, is based upon the truth. If we enquire concerning the causes which explain the unfavourable course of the disease in corpulent individuals, we find that a variety of circumstances must be taken into consideration. In the first place, experience shows that in these cases the temperature generally reaches a higher degree . Moreover, fat persons possess a slighter resistence to elevation of temperature; the parenchymatous degenerations of organs appear earlier and are more developed, and the heart especially is less able to hold out for any length of time. Finally, we must also bear in mind that treatment is much less effective in corpulent persons, owing to the fact of their metabolic powers being less active than in the lean. Murchison says that a large muscular development is likewise an unfavourable element in prognosis, and that he has seen the strong and robust succumb to the disease oftener than the feeble.

The mortality from the disease appears to be be greater in certain families, than in others. This has been ascribed by some writers to peculiarities of constitution, but it may be due to other causes, as for instance, differences in the intensity of the poison.

Enteric fever is also often very fatal among those addicted to intemperance. Such persons usually bear the disease very badly in consequence of the presence of various degenerations of one or more of the important organs of the body caused by the excessive indulgence in alcoholic stimulants. Death, in the case of drunkards, occurs very often from paralysis of the heart.

Recent residencein an infected locality has been shown by Murchison and others to have a decided influence in increasing the fatality of the disease.

Persons attacked by enteric fever for the second time generally suffer from it to a much milder degree than in the first instance.

The influence of pregnancy is variously estimated by authors. Murchison says that it is a far less formidable complication than is usually thought, whereas others, of no less repute, hold a directly opposite opinin.

Persons who suffer from chronic diseases, if attacked, as is rarely the case, by enteric fever, are in greater danger than healthy persons. Individuals with heart affections, emphyema, or bronchial catarrh are said to be more liable to paralysis of the heart than others. Diabetics are likewise in great danger.

The general mortality of enteric fever is very variable, and exhibits this character in different years, and in different seasons of the year. Certain epidemics have been exceedingly fatal, while in others the percentage of deaths, has been very small. There can be no doubt that in most of these cases there has been a difference in the virulence of the poison. Statistics as to the mortality of the disease to be reliable must. therefore, be based upon a large number of cases extended over several years.

Murchison placed the mortality-rate at about 15 per cent. Other observers have obtained slightly different results. Thus, the mortality was 11.16 per cent. in the 197 cases analysed by Hale, and 13.5 per cent. in the 303 cases collected by Jackson. Cayley (Med. Times and Gaz., 18 78) found the death-rate of the several hospitals to be 17.8 per cent., and Geissler (Schmidt's Jahrb.) that it was in all the German hospitals 12.8 per cent. in 1878. Flint had 18 deaths in 73 cases, or 24.4 per cent. Previous to the introduction of the Brand method of treatment, the death-rate in hospitals ranged from 12 to 25 per cent. , with an average mortality of 17 per cent. A remarkable exception to this high rate is afforded by the Cork street Fever Hospital, Dublin, in which, during the twenty years ending March 31st, 1891, 1.405 cases of enteric fever were treated, of which only 121 proved fatal, or 8.6 per cent. The mortality in private practice is, for obvious reasons, considerably less than in hospitals. The stage of the disease at which efficient treatment is begun has a marked influence upon the result. This is strikingly shown by some observations of Jackson: 90 cases were admitted into the Massachusetts General Hospital during the first week - of these 7 died,

or 1 in 12.85; 139 cases were admitted in the second week - of these 16 died, or 1 in 8.68; 46 cases were admitted in the third week -- of these 10 died, or 1 in 4.60; and 21 cases were admitted in the fourth week, and of these 5 died, or 1 in 4.20 Convalescence also occurred much earlier in those who were admitted at an early stage of the disease. Making due allowance for the varying severity of certain epidemics, the death-rate of enteric fever can be estimated at 10 per cent. all round.

T R E A T M E N T

P R O P H Y L A X I S.

SANITARY MEASURES.

These, if properly carried out, may be expected to be preventitive to a great, if not entirely, to the spread and propagation of enteric fever. All are now agreed as to the great importance of an efficient system of sweerage, with a thorough flushing of the sewers at regular and frequent intervals, for disposing of the faecal discharges of all towns, no matter how inconsiderable in size, No less important is it that the drains of every dwelling should be well constructed and kept in good order. They should be trapped just before they empty into the sewer, and should be provided with the means of thorough ventilation between the trap and the walls of the house by a free communication with the outer air. The soil-pipe should be carried up three ortfour feet above the top of the house, and every water-closet, bath, washstand and sink should have its own separate trap, and none of them should be placed in rooms unprovided with a window or with some other sufficient means of ventilation. Medical practitioners should as sanitarians, urge upon the authorities of all cities and towns the importance of deriving their water-supply from a source unpolluted by sewage or by any other substance likely to be deleterious to health. They should also see that when water is stored in a tank inside of a house the overflow pipe does not communicate directly with the drain; since if this is allowed to occur the water may very soon become contaminated with sewer gas, and consequently unfit for internal use. In the case of isolated country-houses and of small villages some other means of disposing of the faecal discharges of the inhabitants than by sewers has to be found. Often a cesspool has to be utilised. Care should, however, be taken that this is so constructed and situated that there can be no filtration of its contents into wells from which drinking water is derived .

As the infection is commonly conveyed in the stools and urine, the importance of thoroughly disinfecting them cannot well be overestimated. Disinfection of the faecal discharges is to be accomplished by the action of powerful chemical agents . Chloride of lime dissolved in pure water in the proportion of six ounces to the gallon may be used for this purpose. One quart of the solution

is to be poured over each discharge, thoroughly mixed with it, and the vessels allowed to stand for an hour, or more before being emptied into the privy or water-closet. If the discharge be very copious, it is advisable to use even a larger amount. For the disinfection of solid faecal matter the above solution should be of double the strength. The matter to be disinfected should be exposed to the action of the solution for four hours, and solid masses are to be broken up by the agitation of the vessel. Solution of carbolic acid 1 to 20 , or of sulphate of copper 1 to 25 may be used for this purpose, but the best of all is corrosive sublimate of the strength of 1 to 500 . The fluid should be coloured red by the addition of potassium permangamate and kept in a glass bottle, for the reason that the corrosive sublimate is decomposed by contact with copper, lead or tin, mercury being precipitated . Formaldehyde, a product of wood alcohol, is strongly recommended for the disinfection of typhoid stools. An eight- per- cent. solution of the gas is employed. Though rapid in action it is somewhat expensive. No stool from a case of enteric fever should be thrown into a closet without having been previously disinfected as above. Great care should be taken to prevent the contact of the discharge with the wood-work of the seat. The closet is to be fully flushed several times a day, and a quantity of carbolic acid- solution or chloride of lime solution should be allowed to remain in the basin during the interval of its use. The stools, even after thorough disinfection, should never be thrown upon the ground. In camps or country districts, where there are no water-closets or privies, the stools should be mixed with saw-dust and burned, or buried in trenches four feet deep and covered with milk of lime. The trenches should always be distant from any source of water supply, and also far removed from the kitchen or larder . It is very important to bear in mind that the stools whether in bedpan or trench, should never be left exposed to the air, and should always be promptly covered with a disinfecting solution. After each movement of the bowels the buttocks and anus of the patient should be cleaned with a 1 : 60 carbolic acid solution, or a 1 : 2.000 corrosive sublimate solution, followed by hot water and soap. The mattress should be protected by a rubber cloth placed under the sheet. All body linen and bed clothes used by the patient should be soaked for several hours in a 1 : 20 carbolic acid solution

or one of corrosive sublimate i n the strength of 1 : 1.000, and then boiled for at least half an hour. Thermometers, enemas, syringes, and all utensils coming in contact with the patient should be cleaned with soap and water and similiarly disinfected. Nurses should wash their hands with hotwater and soap, and disinfect them - especially before eating or manipulating the patient or his appointments - with corrosive sublimate solution of the above strength. Furthermore, disinfection of the stools should be continued until the patient is convalescent and able to leave his bed. The same attention should, of course, be accorded the urine, Finally. after death or recovery of the patient, the mattress, bed clothes, and all other articles that have come in contact with him should be thoroughly aired or disinfected or burhed.

GENERAL MANAGEMENT.

The successful treatment of enteric fever is largely dependent on the attention which is given to the general management and nursing of the patient. As soon as the disease has declared itself, or is suspected , the patient should be put to bed forthwith, and not allowed to leave it on any pretext, not even to empty his bladder, after the first week. This is a rule which should be rigidly enforced in every case, no matter how mild the symptoms may be. Its non-observance, either through the neglect of the practitioner or nurse, or wilfulness of the patient, has been the cause of many disastrous results; in illustration of which it is only necessary to refer to the frequency with which perforation of the bowel occurs in "walking cases" of enteric fever. Perfect quiet should be maintained in the sick room. Visitors should be excluded from it, and the attendants limited in number to those actually necessary to carry out the directions of the physician . The nurse, or nurses , should be possessed of the highest intelligence. At the beginning of the illness the attending physician should give to the nurse specific instructions as to the general management of the case, the diet, and the disinfection of the discharges and bed - linen, and should see that his instructions are understood and carried out. At his daily visit he should write our his directions for the twenty-four hours, and should receive from the nurse a written report of the amount of nourishment , number of discharges, and other clinical data of importance. Constant watching must be maintained from the beginning of the disease to the end of convalescence. In the sick room all unnecessary talking is to be avoided, and especially conversation carried on in a low tone of voice, which is always annoying

to the patient. As repose of mind is only second in importance to repose of the body, the patient must not be informed of any exciting news or disturbing communication - postal or otherwise.

In view of the long duration of enteric fever -- the patient being rarely able to leave his bed under four weeks, and more frequently being obliged to keep it for a much longer time - the sick room should , whenever practicable, be large, airy, sunny and provided with an open fireplace, which is a much more efficient means of securing thorough ventilation than an open window, or steam or furnace heat. The room should not be too warm, and the temperature should be steadily maintained at between 65° and 68° F. If two rooms are used, the window of the unoccupied room should be kept constantly open day and night. Screens serve to guard the patients from draughts and are conducive to sleep by softening the light. The bed should be single so that the patient may be easily got at from either side, and the covering as light as possible. The mattress should neither be hard nor too soft. A feather mattress must never be used. One of spring and covered with a hair mattress makes the best bed for a prolonged illness. A rubber cloth should be spread under the sheet. The latter should be kept smooth to prevent the formation of bed-sores, and the patient's position frequently changed. This likewise lessens the danger of hypostatic congestion of the lungs. The back, the sacral and trochenteric regions should be bathed at least once a day with alcohol. Should a sore appear, it must be protected by an air-cushion and treated on antiseptic principles. Protracted cases require a water-bed Among the minor duties of the nurse, which are not, however, of inferior importance, are the moistening of the patient's mouth, cleansing his tongue, the prevention of the accumulation of sordes, and the most scrupulous care of his person in other respects.

D I E T.

The careful regulation of the diet is also a point of great importance in the management of e nteric fever. The difficulty lies in feeding a patient who is likely to be ill for some weeks, who has a diseased condition of his bowels, and whose convalescence is apt to be slow and in need of careful attention. Owing to the presence of the fever, there is an actual diminution in the digestive and absorptive powers; the digestive juices are less active, and the amount of hydrochlor-

ic

acid in the stomach is diminished . The liver is more or less disturbed, and the bile is less active than normally the case. Peristalsis is lessened and absorption defective. In addition, ulcerations occur in the intestines and are liable to go on to perforation. Food and drink should be given at regular intervals both by night and by day; the appetite of the patient should not be consulted, for these patients are often apathetic and have no desire for food. The food should be given at intervals of from two to four hours, according to the condition of the patient, and the quantity at a time. The question of drink is also of great importance in these cases, for thirst is often a distressing symptom. Pure water, given with or without ice, is to be depended upon, but if there are no contraindications, this may be varied in many ways. The natural spring waters, or if these cannot be obtained, the artificial ones, are often useful. The artificial waters contain large quantities of carbon dioxide, and to avoid trouble they always be allowed to effervesce before they are given to the patient. If there is no marked intestinal disturbance, fruit-juice may be added to the water. Lemonade, raspberry juice, or raspberry vinegar, and water are often welcome changes. Weak tea also tends to allay the thirst. Cold weak coffee is preferred by some. Red wine and water, white wines, or even sherry or brandy and water may be given to some patients, especially if plain water causes unpleasant symptoms. When there are irritability of the intestine and severe diarrhoea, red wine and weak tea are to be preferred. Albumin-water, since it combines food and drink, is most useful. It may be flavoured with lemon- or orange -- juice, or may be shaken up with a little sherry or brandy. The various mucilaginuus drinks may be used, but are not generally relished. Gum-arabic - water, arrowroot -water, bread-water, barley-water, oatmeal -water, and similar beverages are allowable. But the food par-exellence in this disease is <u>milk</u>. There is no one food that meets so many indications. It possesses great nutritive value, is easily procured, as a rule, and is generally easily administered. It must be borne in mind, however, that there are some patients with whom milk disagrees, and many who do not like it. The amount to be given daily varies between one and three quarts, according to the patient. If milk is given plain, it is usually only a question of time when it will disagree with the patient. Children are more apt to take it over long periods than adults. There are many ways of modifying milk and rendering it more agreeable, and more digestible to the

patient. The simplest method is to add from one to three ounces of lime-water to each glass of milk, or plain water or a mineral water may be used instead. If milk is well borne and it is desired to increase the amount of nutriment, cream may be added to it. If this causes unpleasant symptoms, it should be discontinued at once. Butter-milk may be given occasionally, but is far inferior in nutritive value to plain milk. Kumiss or kefir may be used, and when they may not be relished at first, most patients learn to enjoy them. A pinch of salt may render milk more palatable to some persons, and the addition of a spoonful of brandy may be relished by others. The milk may be given cold, be flavoured with fruit juices, vanilla, or nutmeg, or it may be given in the form of ice-cream. When milk is not well borne, it is a good plan to prepare barley-water and add to it an equal quantity of milk, boiling them together for a few minutes. Plain boiled milk may also be used with benefit. Among the disagreeable symptoms to which milk gives rise may be mentioned a bad taste in the mouth, a sense of fulness or pressing in the abdomen, eructation, or even pyrosis. When the milk is not well digested, it may cause diarrhoea, with colicky pains, and the undigested curds will be found in the stools. Malted milk may, however, be used, the milk may be mixed with some of the invalid foods, or it may be partially or completely peptonised.

When milk disagrees or becomes distasteful to the patient meat broths are useful They may be prepared from beef, mutton, veal, or chicken. They may contain a little rice or barley, but should be strained before they are taken. The juice expressed from slightly boiled beefsteak is of great value in enteric fever, and is thoroughly well borne. If diarrhoea exists, beef and mutton broths are apt to aggravate it and must not be given too frequently. Bouillon may be employed as may also the various liquid beef preparations and meat-juices now on the market. Mosquera Meat Jelly and Valentine's Beef-Juice are useful but expensive. Beef-extracts are more stimulating than nutritious. Some prefer to use gelatinous substances, such as gelatin, calves'-foot jelly, bottle-bouillon, and the like. Clam soup and oyster stew, or oysters with gellatin, give agreeable variety to the diet.

It is not advisable to give eggs too freely. Egg-water, however, when properly prepared, rarely caused distress. Raw eggs may occasionally be given, or the yolk of an egg in bouillon or

broth. Eggs and milk together may cause indigestion, but if the patient is in need of a stimulant as well as a food brandy and egg in mixture may be used, and in moderate quantities is nearly always well borne.

Plasmo n, nutrose, somatose, eucasin, and similar preparations may be exhibited in accordance with the directions of their manufacturers.

Alcohol should not be given in enteric fever as a matter of routine. The tendency today is to give it in smaller quantities than formerly, and many have abandoned its use altogether. It is, nevertheless, a valuable ally in overcoming the disease, and should not be discarded, It should not be given to children, as a routine treatment, but even in young patients it is often of the greatest service. It is, moreover, not necessary to prescribe it always, even in severe cases, at the beginning of an attack. In habitués, alcohol will be needed from outset. The chief indication for its use are to be found in the state of the heart, the pulse, the tongue, and the nervous system. If the impulse of the heart grows weak and the first sound obscure, or the pulse becomes soft and compressible or unduly rapid or weak and irregular, alcohol is called for. A dry brown tongue indicates, as a rule, the need of stimulants, and under thier use it will often become moist and clean at the edges. The presence of extreme restlessness or low muttering delirium is usually an indication for the exhibition of alcohol; and the same may be said for the presence of complications in general, and the typhoid state in particular. It is not possible to lay down any general rule as to the amount to be given, even in severe attacks. This will vary in different cases, and to a certain extent will be determined by the effect it produces.

H Y D R O T H E R A P Y.

The cold-water treatment of enteric fever is that most generally accepted at the present day. It is by no means a novelty, since it was practised in the form of cold effusion in the treatment of fevers as long ago as 1787 by James Currie, of Liverpool, who may be said to have introduced it, and who asserted that it had the power not merely of moderating the symptoms, of these diseases, but also, in many cases, of cutting them short. It enjoyed at first a high degree of popularity, which lasted from twenty to thirty years, but finally fell into disuse, probably in consequence of the exaggerated

character of the claims which were made for it by its advocates. Although resorted to from time to time in various parts of the world, the merit of having brought it again into notice is due to Ernst Brand, of Stettin, and his vigorous and persistent advocacy of its merits has led to its being called by his name. Since the publication of his work on "The Hydrotherapy of Typhoid Fever" in 1861, the recorded observations of Bartels, Jürgensen, Ziemssen and Liebermeister in Germany, and of Wilson Fox and others in England, have so far restored the treatment to professional favour that there are few physicians either in this country or abroad who do not both advocate and practise it as opportunity indicates or affords.

Hydrotherapy may be applied in various ways of which the most important are as hereunder; They all act in the same manner, and depend for their efficacy upon their power of abstracting heat from the body, and are useful just in proportion as they exert such antipyretic action. There is no doubt that under their use distressing and dangerous symptoms (such as coma, stupour, subsultus tendinum, and the like) are often much relieved, the heart and pulse strengthened, the respirations made deeper and slower, and the general mortality markedly reduced.

(1) The Cold Bath Of all methods of applying the cold-water treatment this is the most effective. The bath for an adult should be at the temperature of 68° F., and its duration should be about ten minutes; if, however, the patient shows a sign of great weakness, it should not exceed seven. After the bath he should be wrapped up in a dry sheet or a light blanket and put to bed. If the pulse should then show signs of failing, or if there should be shivering or any other signs of weakness, he should be given a glass of wine, or brandy, or a dose of some other diffusible stimulant, and bottles containing hot water should be applied to his feet. The process of cooling goes on for some time after the patient's removal from the bath, for while the thermometer placed in the axilla will show that the external temperature is immediately affected by it, the same instrument placed in the rectum will indicate a gradual fall, which will continue in many cases for half an hour. Shortly after this the temperature will be observed to rise, and in many cases it will not be more than two hours before it has attained its former height. It is, therefore, necessary to use the thermometer frequently, and to repeat the baths as often as the temperature rises to 103° F. or above it. Usually not more than six

or eight a day are required in the worst cases. It often requires some persuasion to overcome the repugnance which most patients feel at first for these baths, and the shock of being suddenly immersed in cold water is agreeable to very few. Later, however, this repugnance entirely disappears ----- in the majority of instances at least Intestinal haemorrhages, perforation of the bowel, and great weakness of the heart's action are all contraindications to the use of the cold bath. The existence of pneumnia or of hypostatic congestion of the lungs is not, in the opinion of many, a sufficient reason for abandoning it, rather an indication for its employment.

(2) The gradually-Cooled Bath. As the use of this form of bath involves less shock to the system it is preferred in some cases to the cold bath. It is, therefore, more suitable than the latter for nervous and excitable patients, for persons of advanced age or of general feebleness of constitution, for for very young children. In it the temperature of the water, which at the time of immersion of the patient should be at or above 95° F, is cooled by the gradual addition of cold water until it is reduced to 72°, or below this point. These baths, to produce the same effect as the cold baths, must be of longer duration. They are contraindicated in the same conditions as the latter, but to a less degree.

(3) Cold Affusion - This consists in placing the patient in a tub, and throwing cold water, -- 60° F., by means of a sponge, over his head, face, nexk, shoulders, and chest. This is repeated once or twice just before he is removed from the bath. It is done rather for the sake of its good effect upon the nervous system in cases of great stupour and other evidences of serious nervous derangement than merely as a means of reducing high temperature, for which latter purpose it is vastly inferior to the cold bath. Cold affusions may be practised in bed, the patient being suitably protected by a mackintosh sheet.

(4) The Cold Pack -- This is given as A blanket is spread evenly over the bed or couch; over this blanket is laid a coarse sheet wrung out of water, of the prescribed temperature and folded once. The patient is lifted upon the bed thus prepared and quickly wrapped in the wet sheet by the attendant in such a manner that is lies as smoothly as possible over every part of the body except the head. If the extremities feel cold before the packing, they must be warmed by friction or else not included in the packing.

So soon as the wet sheet is everywhere in contact with the body, the attendant folds the blanket over the patient in the same way, first drawing over and tucking one side smoothly under and then the other, seeing that the chin is free, and that the blanket is folded evenly, but without tension at the neck. Finally the long end is drawn down and folded smoothly under the feet. Three or four thicknesses of wet sheets spread upon the blanket are necessary to reduce the temperature effectively. The reduction of temperature from a single pack is usually transient, and repeated packings, even to the number of five or six, are often administered, the rise of temperature being slower after each. When the temperature does not rise above normal, or when shivering takes place, the packing must not again be renewed. When repeated packings are necessary, two couches may be used side by side, and the patient lifted directly from one pack to the other. By unfolding the blanket and sprinkling the sheet afresh with cold water, the same effect is produced, but less completely. The patient should be allowed to remain in the last pack for half an hour to an hour; at the expiration of this time the skin generally becomes pleasantly warm, and perspiration occurs in many cases.

(5) Cold sponging. In the hands of skilful nurse, cold sponging not only add greatly to the comfort of the patient, but also exert a favourable influence upn the nervous system and upon the circulation of the blood, by causing it to flow more freely in the vessels directly under the skin. They lower the temperature only slightly - unless the water be very cold, and the procedure frequently repeated - and , therefore, are by many authors assigned a very low place among the methods of abstracting heat fro m the body. The water used may be of the temperature of the body or slightly cooled with ice. The addition of a little alcohol or vinegar serve to increase the effect of the sponging. A sponge or wash-cloth may be used, and more moderate friction according to the sensation of the patient. In all use of water great care must be taken to protect the bed. Every part of the body is in turn bared, washed, dried, and again covered. The spongings may be repeated at intervals of two or three hours according to indications.

(6) Cold Compress For this purpose three three or four thicknesses of old table linen or towelling which is porous enough to hold a good deal of water are most useful. The compress is wrung out of water of the required temperature

and reapplied as it becomes warm; or two compresses may be used alternately, each being cooled in turn by placing it on a block of ice in a basin or pan at the bedside. Cold compresses are often used on the head, and are commonly very acceptable to patients. They are without appreciable effect upon the general temperature and only produce a local fall of body-heat. Leiter's coils exert an effect analogous to that of cold compresses, and are applied fitted to the head or other regions of the body, the water being circulated through them from an overhanging resevoir.

(7) The application of Ice. Ice is usually applied by means of a bladder or specially constructed bag. It must be cracked into pieces the size of a walnut and introduced into the bag with a little water, the bag being about half or two-thirds full. The air is then squeezed out and the stopper adjusted . If the bag be filled or air enough be left in to distend it, it will not conform itself to the part to which it is applied. A much more effectual method of applying ice to the abdomen or over the heart is by spreading out a thick layer of finely-cracked ice between the folds of a coarse towel, which is then placed directly over the skin. It is not available for prolonged use; it is almost sure to wet the bedding, and the method requires constant watching. Frictions with ice are a powerful means of depressing the temperature of the body and may, therefore, be resorted to when for some reason the cold bath cannot be obtained and when not contraindicated by the condition of the patient.

(8) Iced water Enemata. The temperature may sometimes be reduced by rectal injections of iced water. No more than three or four ounces should be employed at a time. They are, when carefully administered, rather grateful than otherwise to patients.

M E D I C I N A L T R E A T M E N T.

Mild cases of enteric fever do not usually require much therapeutic interference. The chief indication for treatment in severe cases, apart from complications, is furnished by the height of the temperature, and this is best met by measure of Hydrotherapy as above detailed.

Antipyretics.

These are still in great favour with many practitioners, but less so since the value of the Brand treatment has come to be universally appreciated. Of the antipyretics in use, quine and the coal-tar derivatives are the

most important.

In order to produce a decided antipyretic effect, quinine must be given in large doses. Murchison says that a dose from 15 to 20 grains causes within an hour or two a fall of temperature, and, to a less extent, of the pulse, which may last from twelve to eighteen hours, and that he had never known any other disagreeable symptom s result from its use than noises in the ears, temporary acceleration and irregularity of the respiration, and occasional vomiting, This quantity will, however, often be found to be insufficient to produce a noteable reduction of the temperature, and it is therefore necessary to occasionally increase it. Liebermeister was accustomed to give to adults from 22 to 45 grains of the sulphate or muriate of quinine, and this does had to be taken within the space of half an hour, or, at most, an hour, as it is useless, he says, to expect the full benefit of this does to appear if the dose is divided and its administration is extended over a longer time. He never repeated it in less than twenty-four hours, and, as a rule, never gave it again under two days. Jürgensen has has exceeded the dose of 45 grains without observing any bad effects from it. When these large doses are taken the fall of the temperature usually begins a few hours after the administration of the remedy, the minimum being reached in from six to twelve hours, and it is usually not until the second day that the temperature attains its former height. It is found in practice that the most decided results are obtained when the drug is given in the evening, so that the time of its fullest antipyretic effects will coincide with that of the morning remission. When these large doses produce vomiting, as they occasionally will, the remedy may be given by the rectum or hypodermically. Quinine, it should be noted, possesses the great advantage over the cold bath that it may be given in conditions in which it would be dangerous to resort to the latter. The existence of great cardiac weakness, of perforation of the bowel, or of intestinal haemorrhage do not usually constitute contraindications to its use.

Acetanilid, antipyrin, and phenacetin are the most important of the coal-tar derivatives. Although , if given in sufficient dose, they will, as a rule, promptly reduce the temperature, their use is not unattended with danger. Numerous instances have occurred in which dangerous and even fatal depression and collapse have followed their administration, even in moderate doses. The employment of these drugs as antipyretics should be

limited to acute fevers of a sthenic type; they are not suited for continued administration in an adynamic fever of long duration like enteric. The occasional use of a small quantity as an adjuvant to the cold bath is permissable, but even in such cases it is as well to give a stimulant at the same time to counteract any possible depressing action. The use of guaiacol -extolled by many - is open to the same objectins as the coal-tar preparations. When painted on the skin it produces a prompt, though only temporary - fall of temperature.

SPECIFIC OR ETIOLOGICAL TREATMENT-

This aims at the destruction of the typhoid bacilli, and their toxic products in the alimentary canal. It is done by means of antiseptics, which also arrest fermentation and check the activity of the ordinary intestinal bacteria which are believed to become virulent in consequence of association with the bacillus typhosus. A large number of antiseptic drugs have been employed for the purpose and apparently with great benefit. The duration of the disease is not usually shortened, but its course is rendered milder and its mortality lessened. The assumption that enteric fever can be artificially aborted has been made upon insufficient evidence. Undoubted cases of spontaneous abortion of the disease are occasionally observed. The alleged termination of enteric fever in the course of a few days as a result of some special form of treatment demands the incontrovertible evidence of a large series of cases to establish its correctness. The cold water treatment is by far superior to the antiseptic treatment about to be described. The latter is intended rather for use in those cases in which the former is of inconvenient or negatived application.

Calomel has perhaps been more systematically used than any other drug. It is employed not only because of its antiseptic properties, but because it is also a safe and efficient laxative, It is very popular in Germany, where seven and a half grains of the drug, and in some cases a much larger dose, are given four times daily on alternate days as soon as the nature of the disease is fully recognised. It is claimed for this treatment that when it is begun early the rate of mortality and the duration of the disease are much less than it otherwise would be. Its advocates, however, admit that the latter is not always the case. Salviation is rarely produced by the calomel. The administration of each dose

is followed by a decided although temporary reduction of temperature, and the diarrhoea , which is at first increased by it, subsequently diminishes.

Rossbach recommends naphthalin, which may be given alone or with calomel. As an antiseptic it is much inferior to others and its vaunted abortive effect in early cases has never been satisfactorily established.

Beta-naphthol is a powerful, non-toxic, and - in proper doses - non-irritant germicide. From five to ten grains may be given three times a day in waters, capsules, or tablets. If constipation exists salicylate of magnesium may be combined with it, or salicylate of bismuth if the opposite condition requires an astringent. (Bouchard). The drug is very highly spoken of. Abdominal pain and meteorism diminish, the tongue becomes clean and moist, and the passages lose their offensive smell. Convalescence is more rapid and secondary complications fewer.

Thymol is also a very efficient antiseptic and may be given in doses from 20 to 40 grains per diem.

A mixture of tincture of iodine and carbolic acid, in the proportion of two parts of the former to one of the latter, has been highly recommended in this disease, especially when nausea and vomiting are present. It does not, however, exert any local action upon the intestinal canal as it is readily absorbed from the stomach.

Chlorme water was recommended long ago by Sir Thomas Watson and Murchison. It has since then been popularised by Burney Yeo. The necessary solution of chlorime gas is prepared as follows; Thirty grains of powdered potassium chlorate are placed in a bottle of the capacity of twelve ounces , and forty minims of strong hydrochloric acid poured upon it. To prevent the escape of the Chlorime gas the bottle is tightly corked until quite filled with the greenish-yellow gas. The bottle is then filled with water little by little, the bottle being well shaken at each addition. Burney Yeo adds to twelve ounces of this solution 24 or 36 grains of quinine and an ounce of orange-peel syrup, and gives to an adult an ounce dose every two, three, or four hours, according to the severity of the case. Yeo claims from his combination of chlorme and quinine great possibilities and remarkable effects. The tongue cleans quickly, and the offensiveness of the evacuations subsides within twenty-four hours after beginning the treatment.

There are also a modification and a sustained depression of the febrile temperature, the average course of the fever is shortened, the physical strength and intellectual clearness of the patient are maintained, with less need for stimulants, there is a greater power for assimilating food and a rapid and complete convalescence, as well as Yeo says, general antisepsis.

The value of salol as an intestinal antiseptic is established. It has the same disadvantage as naphthol in being insoluble in water. By the action of the pancreatic juice it is decomposed into carbolic acid and salicylic acid. It acts upon the alimentary canal like napthhol, and may be given in wafers, capsules, or tablets. Hare says it is likewise a urinary antiseptic, as in its elimination it sterilizes the urine, This is denied by Mark Richardson, who found typhoid bacilli persisting in the urine after a daily dose of 30 grains for thirty days.

Richardson recommends urotropin as vastly superior to salol as a urinary antiseptic. He has convinced himself of its reliability in this respect by actual experiment.

ACETOZONE.

On admission to the York County Hospital patients are put upon ;--

R. Acetozone gr. x
Syr.Aurantii ℥ ij ss
Aq. ad ℥ j

Thus giving a solution of acetozone of strength approx. 1. 900. Of this solution they take as a minimum for adult four ounces every two hours, and as much more as they desire. It is given in preference to any other drink, but is not intended to supplant the fever dietary. In a few cases it is given in solution of 1.600.

(A solution of 1 - 1000 , used by the writer in the surgical wards as a dressing, left on for 12 hours, has caused erythema of the skin round a wound; and left on for 48 hours has in some cases caused Vesication.)

Given internally in no case did it affect the stomach, though two or three patients complained of a feeling of fulness; in one case (G. Wood) the extra amount of fluid probably caused vomiting, though not troublesome: This patient was very anaemic, and in a very low condition on admission; after admission he twice had haemorrhage from the bowel. In all cases it was given in the above quantity till the second day after the temperature was normal; then the same quantity was given every four hours for from three to five days, for another three or five days, and

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was discontinued on the seventh or tenth day of convalescence.

Its effect upon the temperature and course of illness was practically, nil, except in the case of children of whom we had 4 cases: two being treated with acetozone, The temperature came gradually down to normal in about a week, and there were no recrudesences of the fever. The other two without acetozone ran the usual course, with recrudescence; one of them had several periosteal abscesses on the scalp, and in both convalescence was prolonged.

In two other patients, aged 14 and 15 years (Cooper and Barker), it also appeared to influence the fever. In one case (Maria Cooper) while on acetozone there was a relapse which ran a typical course and was associated with some distension, which persisted for some days after the temperature became normal.

In one case there was haemorrhage on two occasions, both slight; this patient was admitted on the sixth day of the fever, haemorrhage occurring on the 10th and 12th days of the fever. There were no other complications.

One patient died; this patient who was admitted on the 9th day of the fever, had haemorrhage the day after admission, again on the 13th and 15th days of the fever, perforation on the 22nd day, and died on the 24th day of illness. At the autopsy, three perforations were found, in the lower ileum, all close to caecum; there was no general peritonitis; but weak adhesions were present round the perforations. The contents of the bowel were not offensive. This case was only diagnosed as enteric fever the day before admission to Hospital, and had not been properly dieted. His general condition was very bad on admission.

In other patients there was no noticeable difference in any way, though the convalescence was rather better.

There were no complications except in the case of the patient quoted above, (and Sarah Wilkinson) (Vide Chart.) The stools in all cases cleared up and lost their offensive odour in the first few days after admission. Of those not treated so, the stools cleared, but to nothing like the same extent.

The drug had no noticeable effect (clinical) in adults on the course of fever, though the convalescence was better, and complications were very few and slight.

The results, though fairly good, were not what the literature issued by Parke, Davis & Co. would lead me to expect. It was given very freely,

but increase of strength did not have any apparent increase of effect.

But of 25 cases treated with it, there was only one death.

Other treatment-

On admission all patients are given cold sponges, morning and evening, at a temperature of 40° F., and if the body - heat at any time was over 103° the sponging was repeated. The patient's temperature is taken every two hours. In severe cases, (Berk, Brown, Wilkinson) with high fever, delirium, and sleeplessness, the patient was "cradled" (i.e., stripped naked, bed cradle put over them, and blanket over cradle; ice-bag laid on abdomen and suspended to the cradle).

Most patients suffered from slight bronchitis, and for it were given Tinct. Camph.Co., Sqr. Scillae, Sqr. Tolu, āā mxx, ag. ad ℥ j. Spleenic enlargement, present in most cases on admission, disappeared in a few days, except in cases not treated with Acetozone.

A simple (soap-water) Enema was given every alternate day, if necessary, for constipation.

For distension , turpentine stupes, and turpentine enemata are given, morning and evening.

For haemorrhage, the writer uses chloride of adrenalin (1-1000) on x every four hours with good results.

ANTITYPHOID SERUM. Bokenham (Trans. Path. Soc., 1898, p. 373), in 1898, prepared an antityphoid serum by inoculating a horse with filtered cultures of the bacil li and then with the dead bodies of the organisms themselves . This serum conferred immunity upon rabbits. Krumfein, (cited by Walker), Jour. of Path. and Bact., 1901, p. 251) uses filtered cultures, then bacteria killed by carbolic acid. The bacilli are grown for fourteen days in broth, to which one-half per cent. of phenol then added. The cultures are injected subcutaneously, and considerable constitutional disturbance may be produced, and abscesses also. The serum of the horse is drawn off and used after a dosage of 150 c.c. has been reached. Antibacterial serum has, so far, however, given unfavourable results in the hands of those who have tried it.

ANTITYPHOID E XTRACT OF JEZ.

By means of this extract, Jez, claims that in enteric fever the general condition of the patient improves, the pulse becomes slower, the temperature falls

considerably, and the morning remissions become more marked and diarrhoea is checked. Jez treated eighteen cases with this extract and all recovered. Other observers have had similarly fortunate results. The extract is prepared by injecting rabbits with a typhoid culture and so immunising them, kiling the animals, and then extracting the minced-up spleen, brain and spinal cord, bone-marrow, and thymus gland with a solution consisting of sodium chloride, glycerine, and alcohol, with a little carbolic acid. It forms a dark, reddish-yellow fluid of alkaline reaction, which is given by the mouth, in desertspoonful doses every one or two hours, according to the severity of the case, until the temperature becomes remittent, then every three hours until the morning temperature is brought down to 100.5° F. An ordinary case requires about seventeen ounces of the extract.

PETRUSHKY'S TYPHOÏN.

Petrushky (Deut. med. Woch., 1902, p. 212) reports good results with a preparation which he designates typhoïn, consisting of dead bacilli, if given early in cases of ordinary enteric fever. It is contraindicated when the disease is advanced and there is a tendency to heart-failure or general intoxication or complications e xist. It has not been received with favour by the profession.

WRIGHT'S VACCINE.

This aims at propylaxis, but may conveniently be diminished at this juncture. The method is really founded upon the experiments of Pfeiffer and Kolle (Deut. med. Woch., 1896) in 1896 as to the effect of inoculating patients with cultures of typhoid bacilli. Wright's vaccine consists of cultures of the bacillus typhosus grown in broth for four weeks, and then sterilised by heating from ten to fifteen minutes at 60° C. The vaccine is sterilised and preserved by the addition of carbolic acid or lysol. For injection on man the dose is the minimal lethal one for a guinea-pig weighing 100 grammes. Redness and pain at the site of inoculation are produced as well as some (usually) slight temporary constitutional disturbance. This, however, may be severe and serious, and Wright (Practitioner, March, 1904,p. 361) now uses a weaker vaccine given in two divided doses. Statistics - mainly from observations on the different units of the British Army in South Africa - speak highly for the efficacy

of the remedy, which is very rapidly coming into general favour.

TREATMENT OF PARTICULAR SYMPTOMS AND COMPLICATIONS.

HEADACHE--The headache of the early days of the attack generally requires no special treatment; it subsides spontaneously between the end of the first and the middle of the second week. Absolute quiet, exclusion of light, local applications, sometimes cold, sometimes warm, constitute, as a rule, all that is necessary to relieve it. A mustard plaster to the nape of the neck is often of service. If still persisting, from three to five grains of antypyrin or phenacetin at short intervals will usually dissipate it. For severe cases suppositories of extract of opium (gr ½) with quinine (gr. 5 - 8) may be employed.

INSOMNIA. In the early stages of the disease insomnia is sometimes an important symptom. Like the headache, it generally diminishes some time during the course of the second week; on the other hand, it is occasionally persistent and exhausting. Bromide of sodium (gr.xv.) and chloral hydrate (gr. viii.) in combination, are probably the most efficient hypnotics for use in enteric fever, but should be carefully handled if the heart is weak.

DELIRIUM, SOMNOLENCE, AND STUPOUR are best relieved by hydrotherapy, and stimulants. Among the latter, alcohol stands first and almost alone; spirits of chloriform and camphor are of use in emergencies; either may be administered subcutaneously, or a five-per-cent solution of camphor in either. Ammonium carbonate is of inferior value; it is, however, frequently used in the treatment of pulmonary complications. Siberian musk is a powerful stimulant in conditions of nervous depression. Its high cost and the difficulty of obtaining it stand in the way of its general use. If delirium be marked, or coma threaten, great benefit is often derived from the local application of cold to the head, by means either of the cold douche of of an ice-cap, the hair having been previously cut short. These applications must be transient and not too frequently repeated, otherwise they may produce depression or collapse. At the same time warm applications to the feet and legs and sinafisms to the praecordia or epigastrium are called for. The tepid or warm bath is often followed by good

results. Tyson has obtained almost magical effects by the application of leeches to the temples or behind the ears when the symptoms suggest incipient meningitis; blisters are, however, to be avoided. Dover's powder usually dissipate nocturnal restlessness, as also do valerian, camphor, and the bromides. The condition yields to catheterism when retention of urine produces it, which is frequently the case. Active delirium yields, as a rule, to hypodermic injection of hyoscine in ~~200~~ $\frac{1}{200}$. gr. doses. Good nursing and perfect quiet are essential in these cases.

EPISTAXIS is rarely so severe as not to yield to the use of simple remedies, such as the application of ice to the forehead or back of the neck, or of styptics locally . In a few cases, however, it is profuse, and it will then be necessary to have recourse to hypodermic injections of ergotine, plugging of the nostrils, linseed poultices to the back of the neck, or adrenalin chb ride.

Vomiting is not a common symptom except early inbe disease, when it can usually be checked by the administration of an emetic and by the application of sinapisms to the epigastriums. The use of emetics is no longer advisable when it occurs after the first week. It is then better to trust to small doses of hydrocyanic or carbolic acid, aromatic spirit of ammonia, calomel, or busmuth. It will be often found that lime-water and milk will remain upon the stomach when every other article of food or medicine is rejected. In some severe cases this symptom may be relieved by the frequent administration of small quantities of brandy in iced soda-water. Small quantities of ice or teaspoonful of very hot water does often effect the same purpose.

TYMPANITIS..

This common symptom of enteric fever occasionally callsfor prompt relief, for, in addition to interference with the descent of the diaphragm and other discomfort it produces, the distended condition of the bowels increases the risk of perforation. It is usually sufficient to employ embrocations or stupes of equal parts of turpentine and olive oil, or of camphor liniment . If the tympanitis ccoexist with constipation, enemata, either with or without a small quantity of turpentine, may often be used with advantage. If it is extreme, an intestinal tube should be introduced very carefully

into the rectum and the gas drawn off. Charcoal, asafoetida , beta-naphthol or salol, have been given in this condition, with a view of preventing or arresting decomposition of the intestinal contents. When the tympanitis is due to debility and to a paretic distention of the bowel it is to be met by free stimulation with whisky and by the use of strychnine in full doses. Puncture of the colon is an operation attended with consider-able danger to the patient, and by many author-ities is not believed justifiable.

DIARRHOEA.-- So long as the stools are of moderate amount and do not exceed in number three or four in the course of twenty-four hours, this condition does not call for special treatment : if, however, the evacuations are copious or frequent it becomes necessary to control them. When diarrhoea is due to errors in diet, such as the use of improper food or excessive amounts of food, particularly milk and the strong animal broths, it usually abates upon the substitution of a more suitable dietary. Diarrhoea may also arise in consequenceof the patient's drinking excessive amounts of fluid, which pass through the bowel without being absorbed and stimulate the secretions of the intestinal mucous membrane.

In the absence of these causes, it is to be attributed to lesion in the intestinals. It is then best treated by disinfectant and soothing remedies, - bismuth subcarbonate or subnitrate in large doses every four or six hours. To this may be added, if necessary, opium in doses proportionate to the age of the patient, but care should be taken not to produce constipation. Opium may be advantageously administered in enemata of starch-water or suppositories, with or without the tincture of cannabis indica. Any of the other astringents and intestinal antiseptic may be administered in the event of the above-mentionedremedies proving useless.

CONSTIPATION. may require attention more frequently than diarrhoea. When it is present so early in the course of the disease that its diagnosis is still uncertain, and has continued for several days, it is best to prescribe a small dose or olive oil or caster-oil, for the inordinart action which frequently follows the administration of this mild purgative will often dispel all uncertainty as to the nature of the disease one has to deal with - When it occurs in a more advanced stage of the disease it is best met by the administration

enemata, which may contain, if there is much tympanitis present, a small quantity of turpentine. As pointed out by Baglivi, in 1878 (Fuhe purgantia tangnam postem. Opera Omnia Medico - Practica et Anatomica, Georgii Baglivi , 1788, strong cathartics as utterly inadmissable .

INTESTINAL HAEMORRHAGE--

When haemorrhage from the bowel occurs, the intestinal tract must be given absolute rest for several hours. An ice-bag, cold applications, or a cold-water coil should be placed upon the abdomen. To relieve the thirst the patient may be allowed to suck small pieces of ice, or ice-cold water or cold tea. may be given in spoonful doses. After some hours the patient may be given a teaspoonful of cold milk, and this may be repeated every two or three hours. Beyohd this, if the bleeding is severe, the intestinal tract should be given complete rest for twenty-four hours or longer. Opium, acelate of lead and opium, sulphate of iron, nitroglycerin and ether strychnine ergot , and other styptics may also be used. If the bleeding has been profuse normal salt solution should be given by the rectum, after raising the foot of the bed. It is necessary to exercise great caution in the return to regular fever diet.

PERFORATION.-- Peritonitis whether due to perforation of the intestine or to other causes; calls for the free administration of opium. When perforation occurs, all food must be discontinued and surgical treatment instituted, or where this is not possible, large doses of opium or morphia may be prescribed. Following operation - which, according to Keen, must not be done during the immediate primary shock which lasts during the first few hours - the diet must be that of the bowel perforation. that has been operated upon. If the patient rallies without surgical intervention,. or when this has been found impracticable, food may be given after an interval of twenty-four hours, but only in very small quantities at sufficiently wide intervals. It is best to begin with teaspoonful doses every three hours, and if the food be retained, this may gradually be increased . When food is rejected, which is usually the case, aggravation of the condition must be prevented by giving the stomach complete rest.

CARDIAC WEAKNESS requires the free exhibition of strychnine and alcohol. The former may be given hypodermically in doses of gr. 1/13 and 1/12 every four hours in urgent cases. Some clinicians, however, prefer caffeine or combine it with the strychnine. Digitalis is not always a safe remedy, especially when myocarditis exists. Nitroglycerin (gr. 1/50 in alcohol or e ther) hypodermically usually meets the indication presented in cases of sudden cardiac failure. Sinapisms to the praecordia and epigastrium are useful adjuvants to t hese measures. The foot of the bed must be raised and the pillows removed when the weakness of the circulation is extreme.

Other complications and sequels require attention on general principles.

MANAGEMENT OF CONVALESCENCE.

During the first weeks of convalescen ce the diet requires as much care and attention as it received during the febrile period; in fact, since these patients often develop a ravenous appetite, born of several week's milk diet and fever, even greater care is necessary. The patient's wishes should in no wise govern his diet, and relatives and friends should be cautioned against giving the patient anything not specifically ordered by his medical attendant. The ulcers in the intestine often remain unhealed for some time after the subsidence of the fever, and errors in diet may therefore readily cause

recrudescence of fever, if not true relapses, and death. As during the early days of convalescence the temperature remains lable, morning and evening temperature should be taken for at least a week, and during this time the diet is to be restricted to milk, eggs, custards, animal broths, or jellies, and the lighter farinaceous foods. At the end of a week, wholesome, easily-d igested solid food, including meat, may be resumed; but the effect of such changes of diet upon the temperature and general condition of the patient is to be carefully watched. If diarrhoea persists, it is to be treated by bismuth and small doses of opium, either alone or in conjunction with the mineral acids. If there is a tendency to constipation, simple enemata or glycerine suppositories may be employed for its relief. Milk,

with whisky, or wine, once a day may be of service during convalescence . In several cases, in which much alcohol has been given during the illness, it is usually necessary to continue stimulation for some time after the subsidence of the fever. Otherwise, alcohol should be dispensed with as soon as possible. Quinine, iron, and cod-liver oil may be given if the convalescence be tardy and anaemia persists. Care should be taken not to let the patient sit up before the end of the first week . It is important likewise to guard patients at this stage from undue fatigue or excitement of any kind. Finally a change of air and scene should, when possible, be secured.

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T H E E N D.

A P P E N D I X

Temperature charts oc enteric fever cases under the writer's care.

In Register.

DR. TURNER.

WARD.

me

Occupn.

idence

Recomd. by

Date of { Admission / Discharge

DISEASE.

rd., Single, or Widod.

Result

DATE.	TREATMENT.	DATE.	DIET.
	As routine treatment all patients were put on cold sponging morning and evening, and whenever the T° rose to 103° F. the sponging was done with water about the T° of 40° F. The T° was taken every 2 hours and, if necessary, the sponging were repeated at each time of taking the T°.		

795 In Register. Copy

DR. PETCH.

WARD. 3

me Barker Thomas

15 Occupn. Smith

idence 5 Eagle Street

Recomd. by J. G. Conchman

Date of { Admission July 31st 1904
Discharge Sept 14 1904

rd., Single, or Widod.

DISEASE. Enteric Fever

Result C.

DATE.	TREATMENT.	DATE.	DIET.
31.7.04	Rx Acetozone gr X Syr Aurantii ℥ ij ss Aq ad ℥ j ℥ iv Every 2 hours " Every 4 hours L.d.s. 14.8. Stop	31.7.04	Milk ℥ ij p.d.
		3.8.04	" ℥ ij " "
		9.8.04.	Bengers Food Breadcrumb. Beefin Eff. m.
		12.8.04.	Low.
		14.8.	Fish
31.7.04	Mist Comph Co ℥ j L.d.s. 5.8.04 Stop	23.8.	Medium.
14.8.04.	ol Ricini ℥ ss. S.O.S.		
	Mist ol Mentha ℥ j L.d.s. p.c.		

Dr. Petch

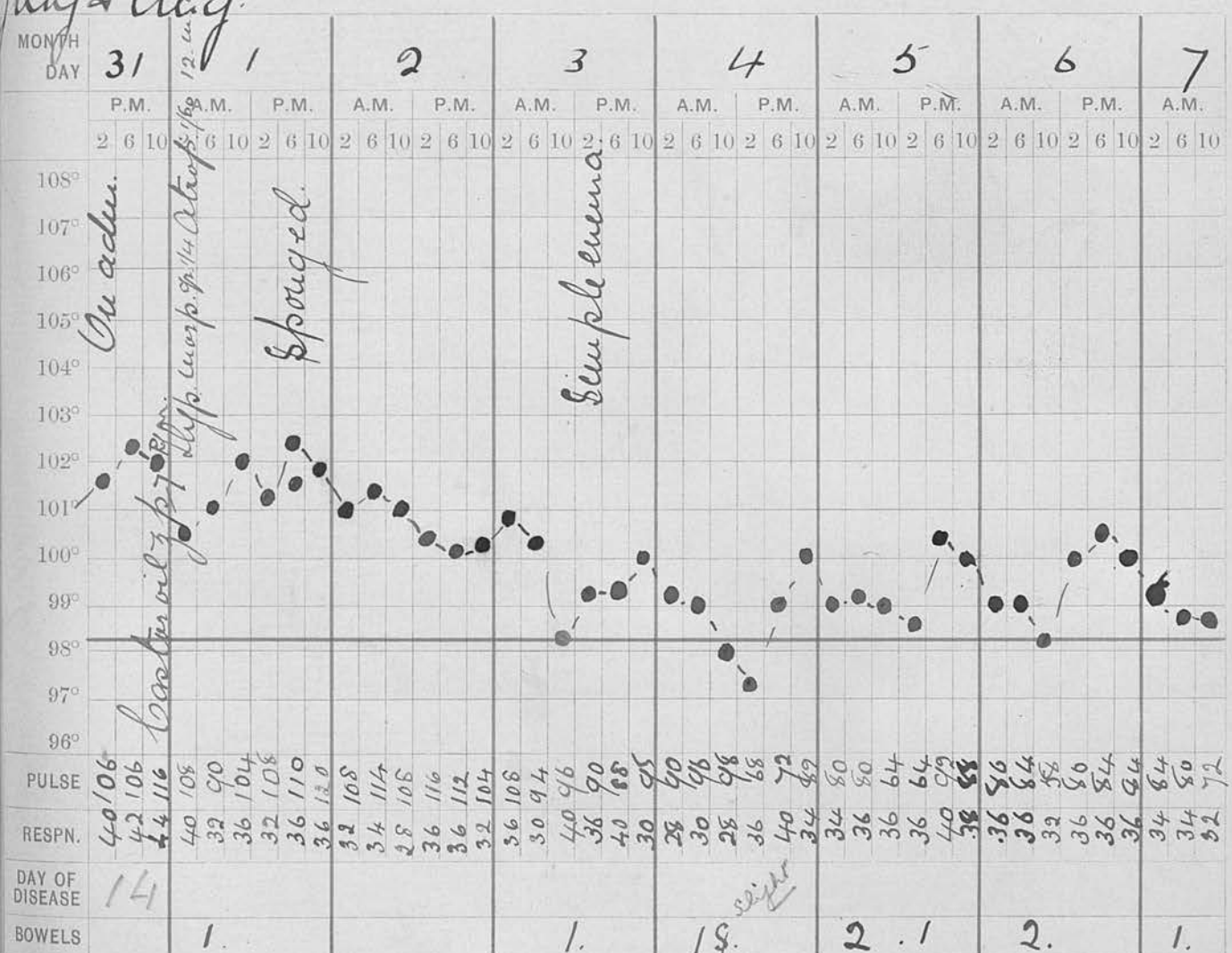
Patient's Name Thomas Barker

Admitted July 31-04

Age 15 Discharged

Disease

July & Aug.



URINE.

DATE.	QUANTITY	COLOUR	SP. G.	RE-ACTION	ALBUMEN	SUGAR	PUS	BLOOD
Aug. 3		Normal	1012	Neutral	clear.			

2000—10/03—Yorks. Herald.

Dr. Pelch

Patient's Name Thomas Barker

Age 15

Admitted July 31-04

Discharged

Disease

August

MONTH																																			
DAY	7			8						9						10						11						12						13			
	P.M.			A.M.			P.M.			A.M.			P.M.			A.M.			P.M.			A.M.			P.M.			A.M.			P.M.			A.M.		
	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10
PULSE	80	82	76	80	76	72	60	66	72	68	68	60	68	64	74	70	68	60	56	56	60	58	60	60	64	52	64	60	66	60	60	56	60	56	56	56
RESPN.	36	36	32	34	30	32	32	32	30	30	32	28	28	32	30	28	30	32	32	28	28	26	26	28	24	26	28	26	24	24	28	24	24	22	24	24
DAY OF DISEASE	21																																			
BOWELS										1.		2				1.		8										2.		2.						

Lung. pneum.

Lung. pneum.

URINE.	DATE.	QUANTITY	COLOUR	SP. G.	RE-ACTION	ALBUMEN	SUGAR	PUS	BLOOD

2000—10/03—Yorks. Herald.

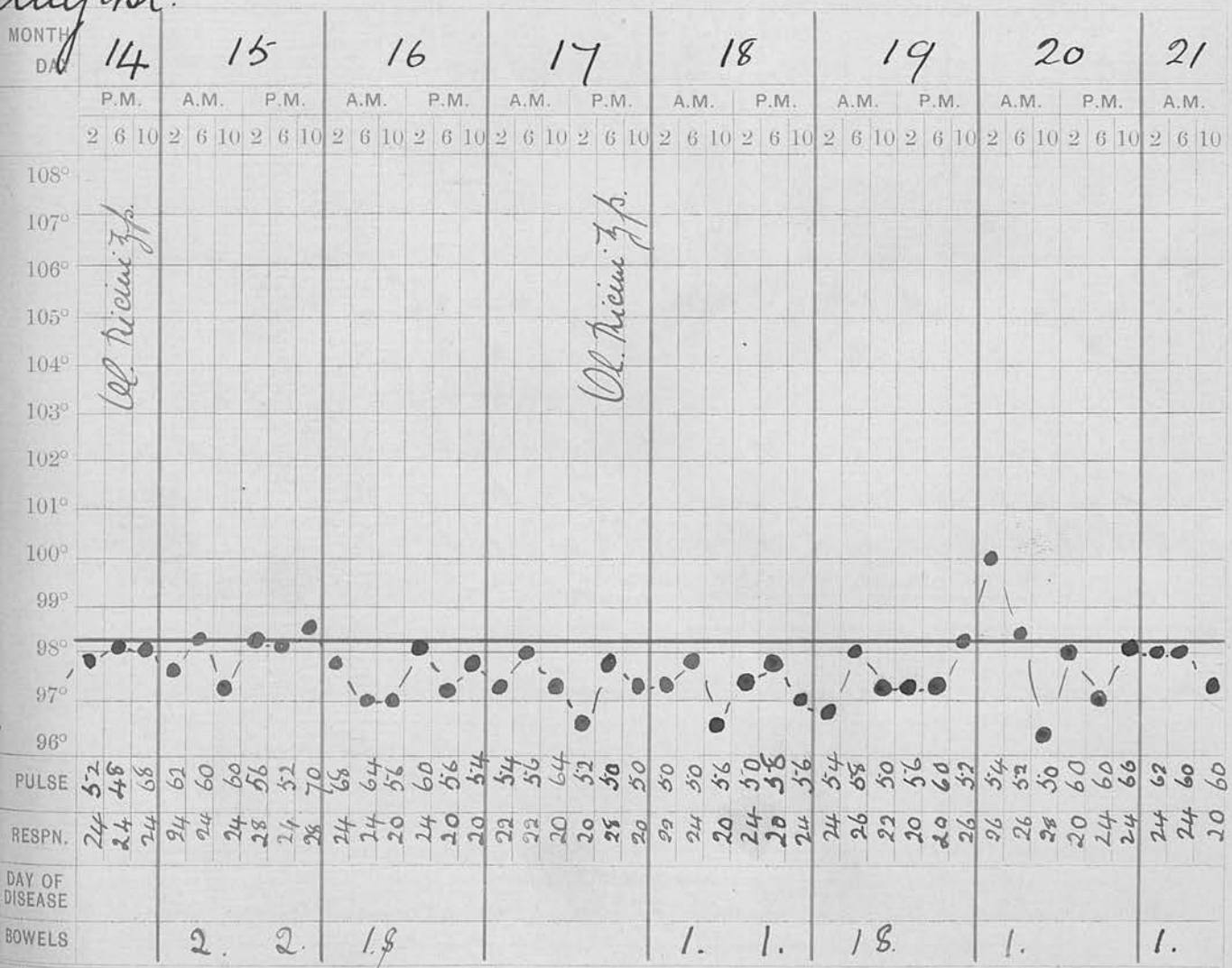
Patient's Name Dr. Petch Thomas Barker Age 15

Admitted July 31-04

Discharged

Disease

August.



URINE.

DATE.	QUANTITY	COLOUR	SP. G.	RE-ACTION	ALBUMEN	SUGAR	PUS	BLOOD

2000—10/03—Yorks. Herald.

Physician Dr. Petch

Admitted July 31. 04

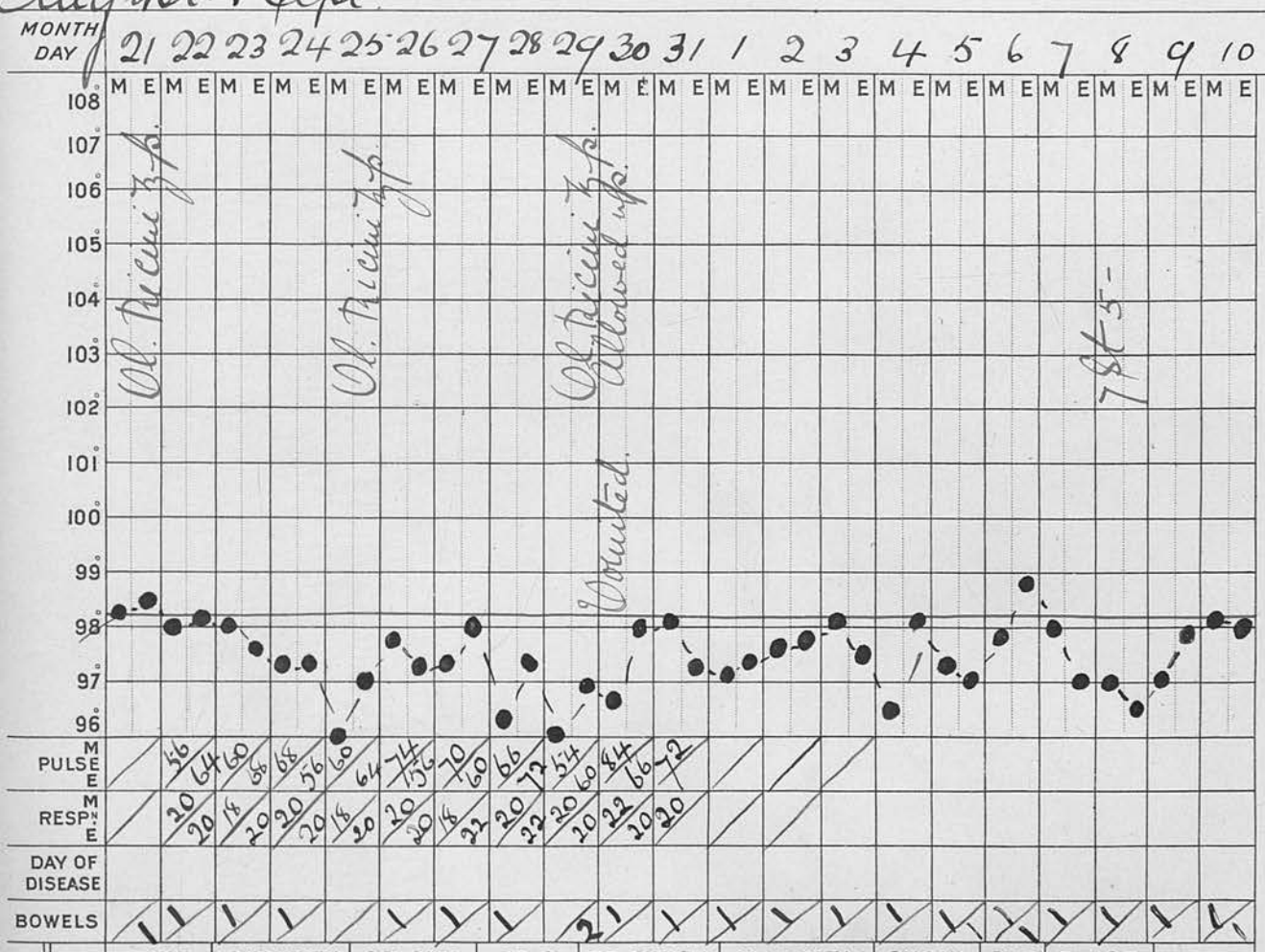
Patients Name Thomas Barker

Age 15

Discharged

Disease

August & Sept.



URINE.

DATE	QUANTITY	COLOUR	SP. G.	RE-ACTION	ALBUMEN	SUGAR	PUS	BLOOD	

500-4-03 Yorks Herald

Physician Dr. Petch

Admitted July 31. 04

Patients Name Thomas Barker Age 15

Discharged

Disease

Sept.

MONTH
DAY 11 12 13 14 15 16 17 18 19

108° 107° 106° 105° 104° 103° 102° 101° 100° 99° 98° 97° 96°

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PULSE M E

RESP. M E

DAY OF DISEASE

BOWELS

URINE.

DATE	QUANTITY	COLOUR	SP. G.	RE-ACTION	ALBUMEN	SUGAR	PUS	BLOOD	

500-4-03 Yorks Herald

In Register.

DR. PETCH.

WARD 6

Name Agnes Beck

Age 19 Occupn. Home.

Residence Drummonds Court Hungate

Recomd. by

Date of { Admission Aug. 25. 1904
Discharge Oct. 26. 04.

DISEASE.

Ward., Single, or Widod. /

Enteric Fever.

Result C.

DATE.	TREATMENT.	DATE.	DIET.
25-8	Acetozone gr X 4th q 6 ℥ 3 iv every two hours. & Liq Ammon Acet 3 ij 4 hrly	25.8.	Milk. Peptonised. Ter die. & Barley water. Ice.
5.10	Emplast. Belladonnae 6"x5" Ext Lial. ij for breast.	30 26 6	Opt. Vin. Gal. 3 ij 4 hrly. Beef tea.
	Cold Sponge. Rep 4.		
26.8.	Phenacetin gr X (6.30 p.m.) statim. Rep in 2 hours.	1.00.	Milk Special Boiled. Beef tea.
31.8.	Pulv Ipecac Co. gr X statim Brist. Camph Co. 3ij. 4 hrly.		Vin Ipecac. m V Opt ammon acetat. m XV Aq Ferv com. m ij Aq Cinnamom m iij q Camphor ad 3 j every 4 hours

4—4.—1903.

882

In Register.

DR. PETCH.

WARD 6

Name Beck. Agnes.

Age 19 Occupn.

Residence Drummonds Ct. Hungate.

Recomd. by W. Lazenby. W.H.F

Date of { Admission August 25th 1904
Discharge Oct. 26. 04.

DISEASE.

Ward., Single, or Widod.

Enteric.

Result C.

DATE.	TREATMENT.	DATE.	DIET.
8.10.	Acid. Sulph. Dil.	8.10.	Low.
	2.d.s.		Fish Spring Boiled.
10.10.	Bucc. ol. Diarrhoea.		Chicken.
	3j. l.d.s. p.c.		Egg.
18.10.	Ol. Ricini.	15.10.	Junket.
	3ss.		Cauliflower
	S.O.S.	18.10.	Stewed Apples.

6
30
26
6

Physician Dr Belch

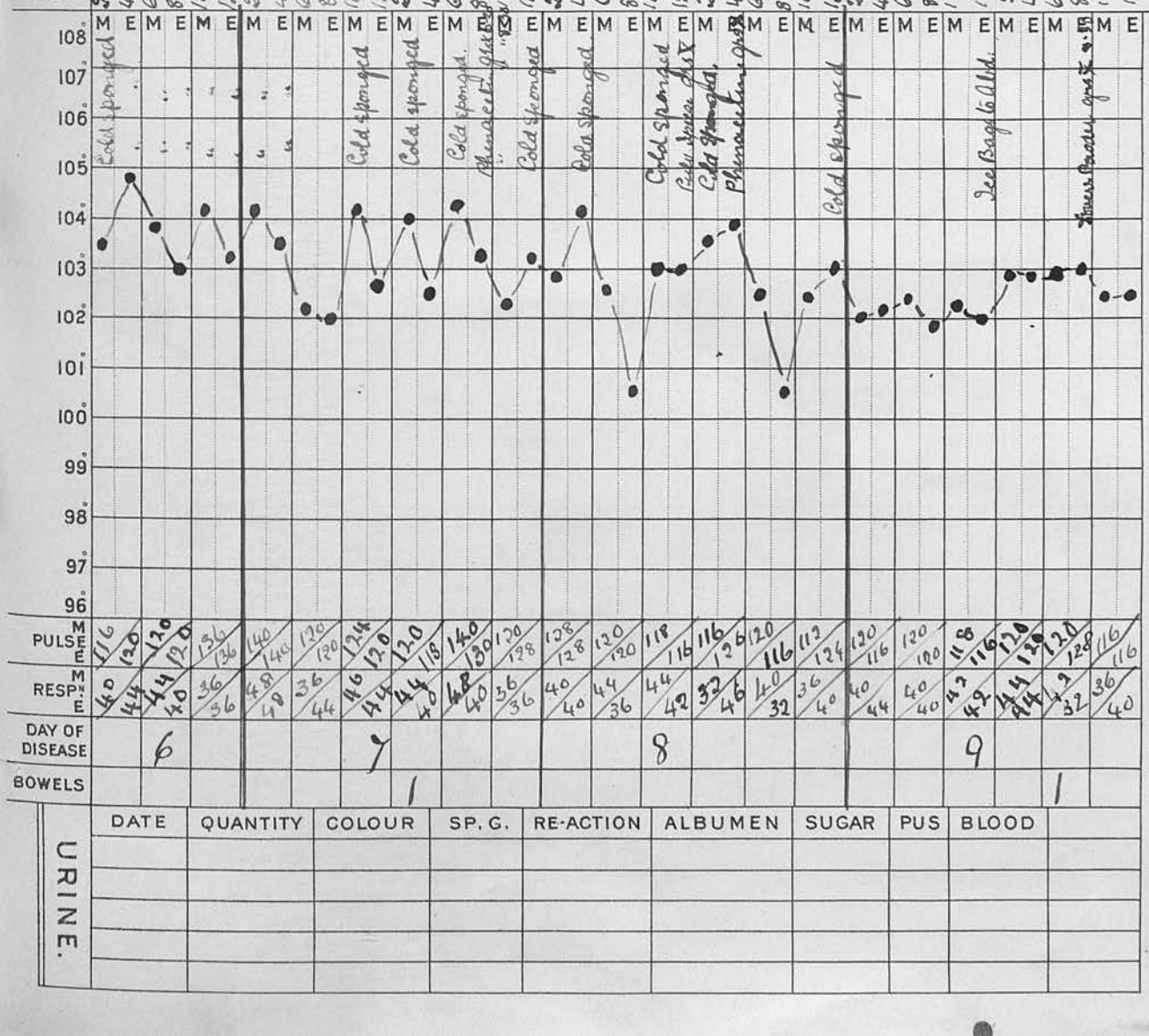
Admitted Aug 25. 04.

Patients Name Agnes Beck

Age 19 Discharged

Disease

Pack, slipped, + cradle over feet, blanket over cradle.



URINE.	DATE	QUANTITY	COLOUR	SP. G.	RE-ACTION	ALBUMEN	SUGAR	PUS	BLOOD	

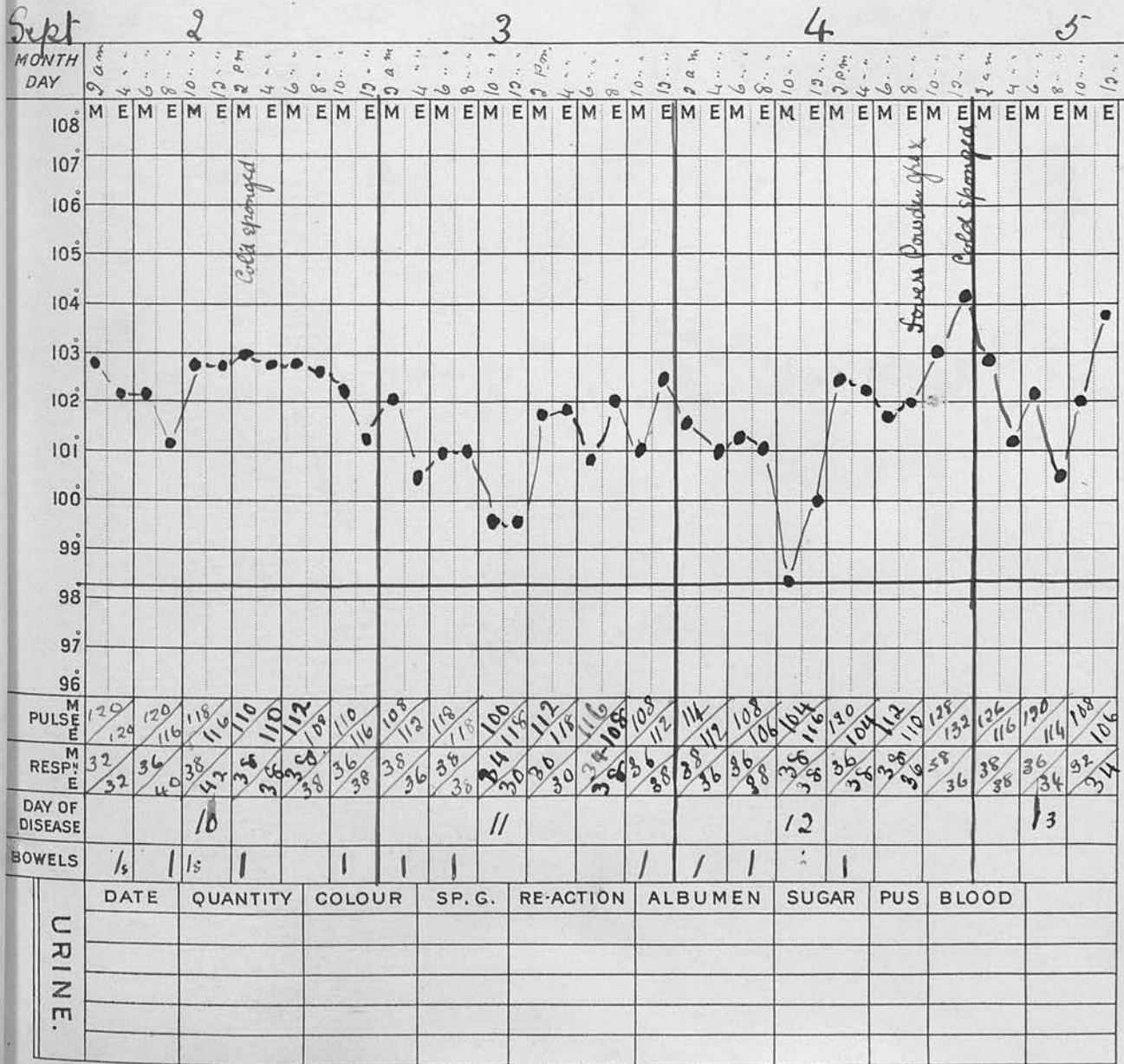
Physician Dr Petch

Patients Name Agnes Beck

Disease

Admitted Aug 25. 04

Age 19 Discharged


Sept
2
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5
MONTH
DAY
M E M E M E

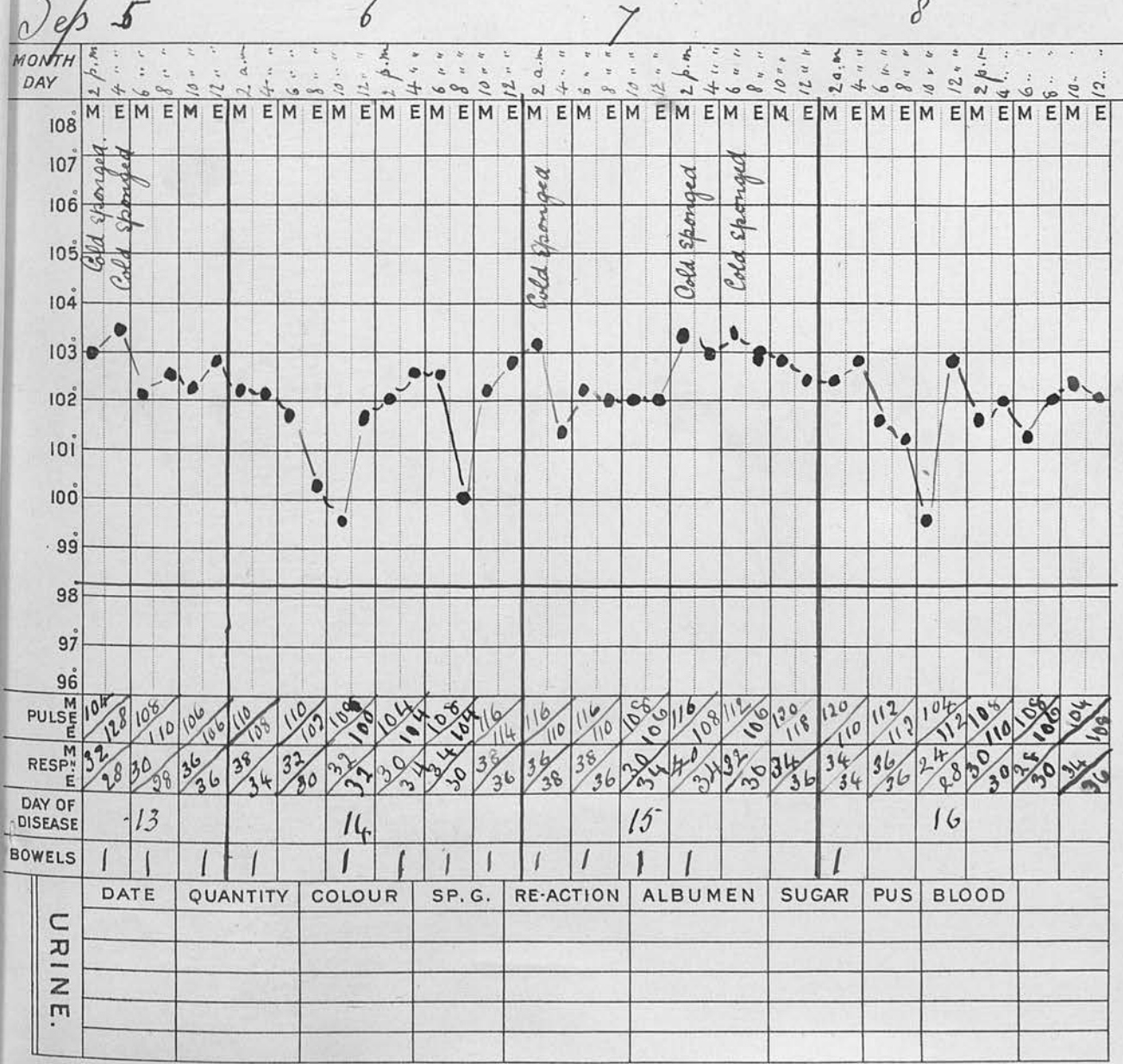
Physician Dr Petch

Patients Name Agnes Beck Age 19

Disease

Admitted Aug 25 = 1884

Discharged



URINE.	DATE	QUANTITY	COLOUR	SP. G.	RE-ACTION	ALBUMEN	SUGAR	PUS	BLOOD	

Physician Dr. Petch

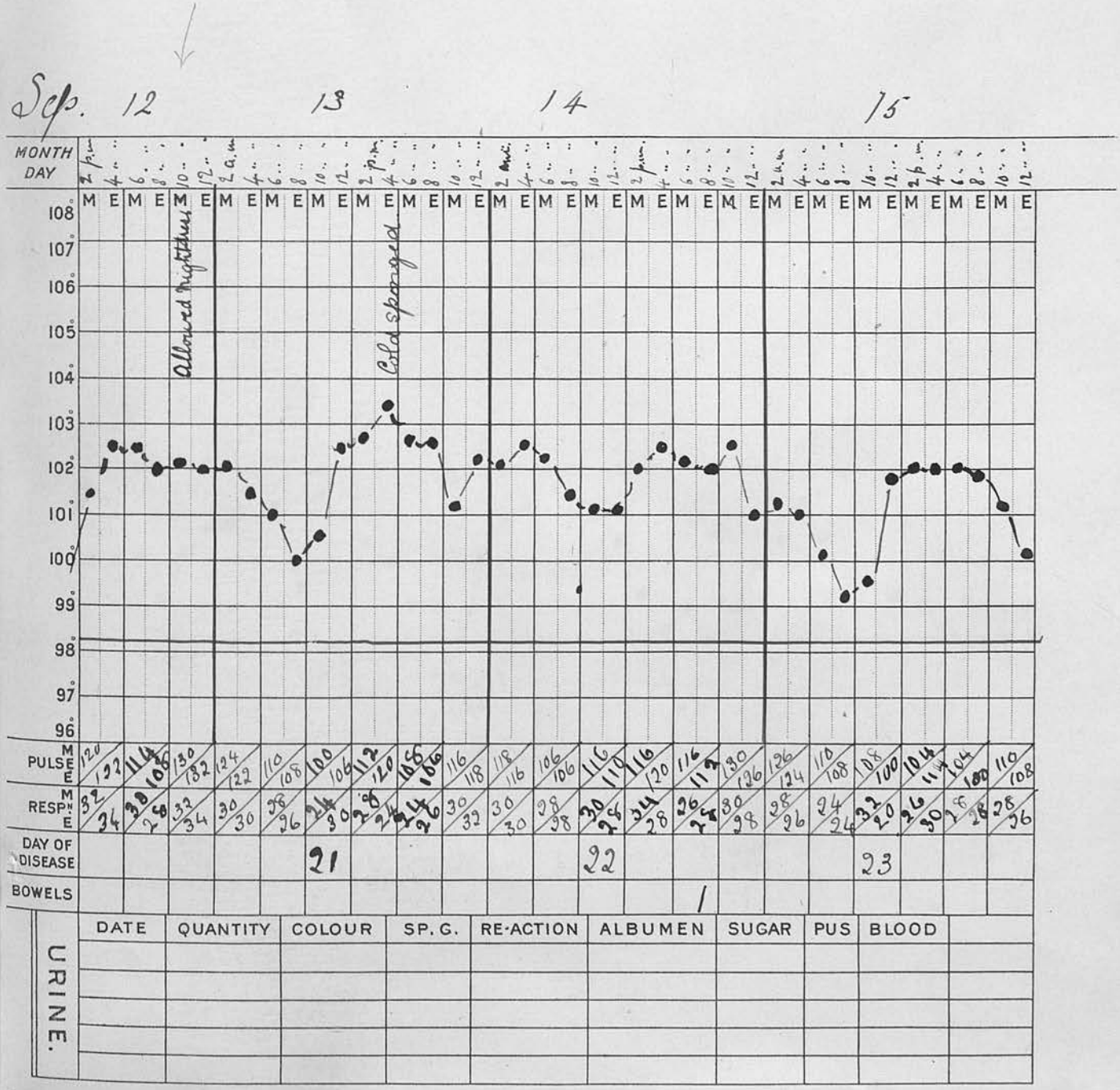
Patients Name Agnes Beck

Disease

Age 19

Admitted Aug. 25th 1904

Discharged



URINE.

DATE	QUANTITY	COLOUR	SP. G.	RE-ACTION	ALBUMEN	SUGAR	PUS	BLOOD	

Patient's Name Agnes Beck

Age 19

Admitted Aug 25th 190

Disease

Discharged

Sep

MONTH																														
DAY	19			20						21						22						23						24		
	P.M.			A.M.			P.M.			A.M.			P.M.			A.M.			P.M.			A.M.			P.M.			A.M.		
	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10
PULSE	100	96	104	102	102	100	104	106	106	106	102	94	96	100	104	102	106	100	96	96	90	96	94	90	90	88	92	90	90	94	92	88	96	88	84	98	88	84	82	96	78	86
RESPN.	28	26	28	24	26	24	26	28	24	22	24	24	24	26	22	22	24	20	26	24	20	22	22	24	24	22	22	22	22	20	18	22	24	24	20	20	20	20	20	20	20	20
DAY OF DISEASE	27			28						29						30						31						32		
BOWELS																1														

108° 107° 106° 105° 104° 103° 102° 101° 100° 99° 98° 97° 96°

URINE.	DATE.	QUANTITY	COLOUR	SP. G.	RE-ACTION	ALBUMEN	SUGAR	PUS	BLOOD

2000—10/03—Yorks. Herald.

A.

Admitted

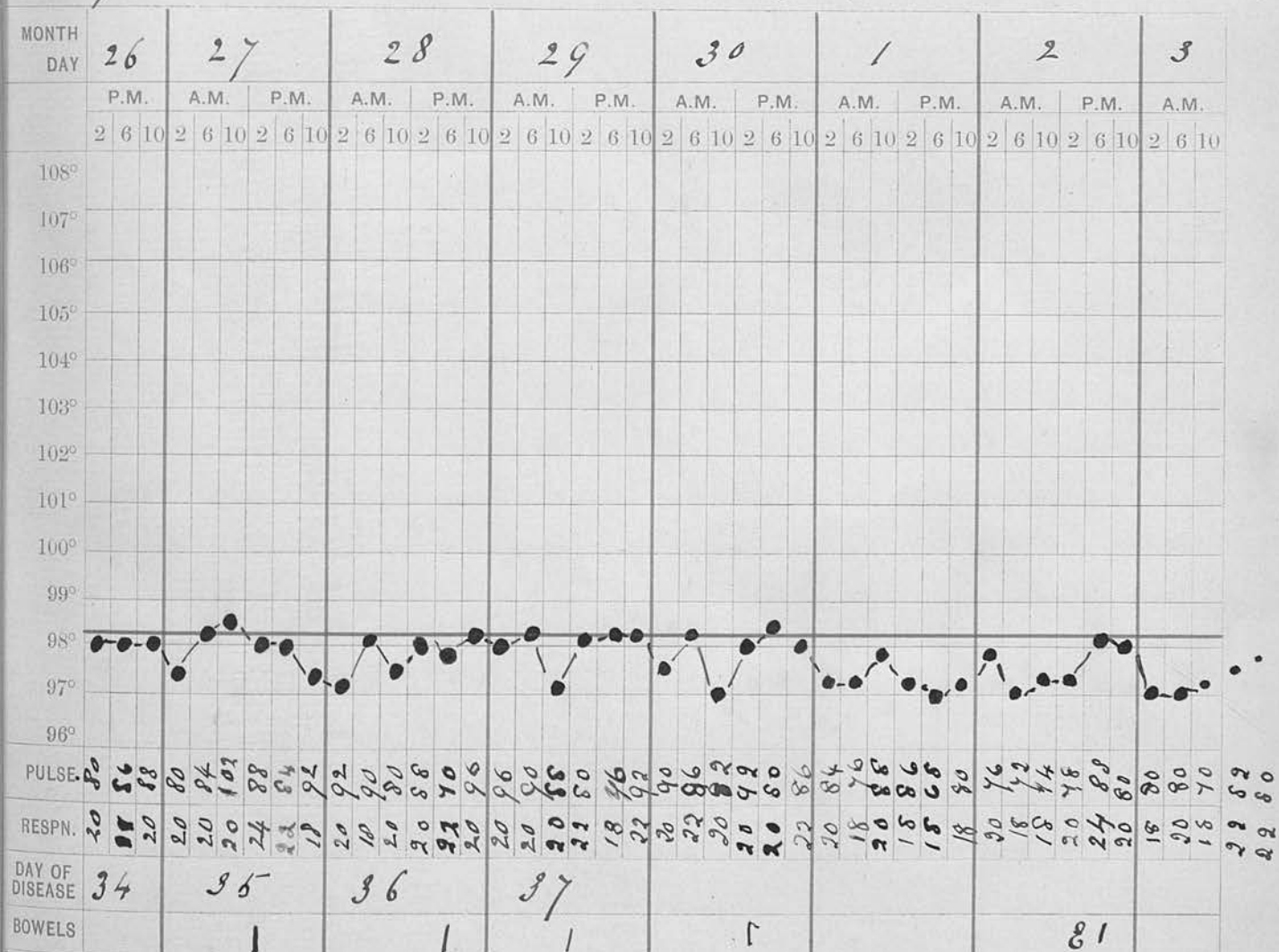
Patient's Name Agnes Beck

Aug. 25th 1904

Age 19 Discharged

Disease

Sep. Oct.



URINE.

DATE.	QUANTITY	COLOUR	SP. G.	RE-ACTION	ALBUMEN	SUGAR	PUS	BLOOD

2000—10/03—Yorks. Herald.

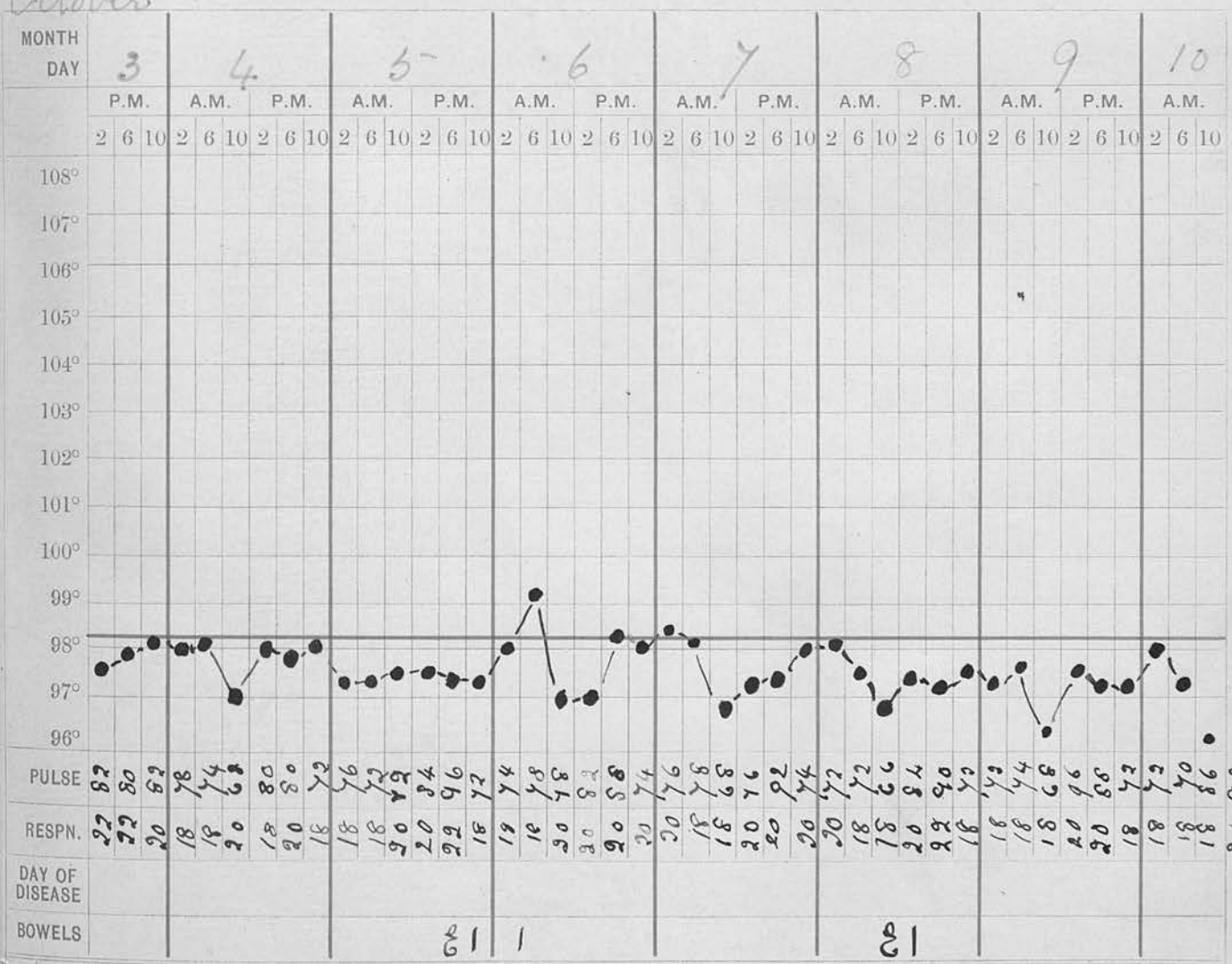
Admitted
Aug 25. 04.

Patient's Name Agnes Beck

Age 19. Discharged

Disease

October.



URINE.

DATE.	QUANTITY	COLOUR	SP. G.	RE-ACTION	ALBUMEN	SUGAR	PUS	BLOOD

2000—10/03—Yorks. Herald.

Admitted
Aug: 26: 04

Patient's Name Agnes Beck.

Age 19. Discharged

Disease

October

MONTH		10			11						12						13						14						15						16						17		
DAY																																										
		P.M.			A.M.			P.M.			A.M.			P.M.			A.M.			P.M.			A.M.			P.M.			A.M.			P.M.			A.M.			P.M.			A.M.		
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PULSE		98	88	94	98	68	80	90	92	90	88	82	74	80	90	96																											
RESPN.		24	20	20	18	18	18	18	24	18	18	18	18	20	20	20																											
DAY OF DISEASE																																										
BOWELS		E1									E1																															

Sat up in Bed.

URINE.

DATE.	QUANTITY	COLOUR	SP. G.	RE-ACTION	ALBUMEN	SUGAR	PUS	BLOOD

2000—10/03—Yorks. Herald.

Physician Dr. Petch.

Admitted Aug 25. 04

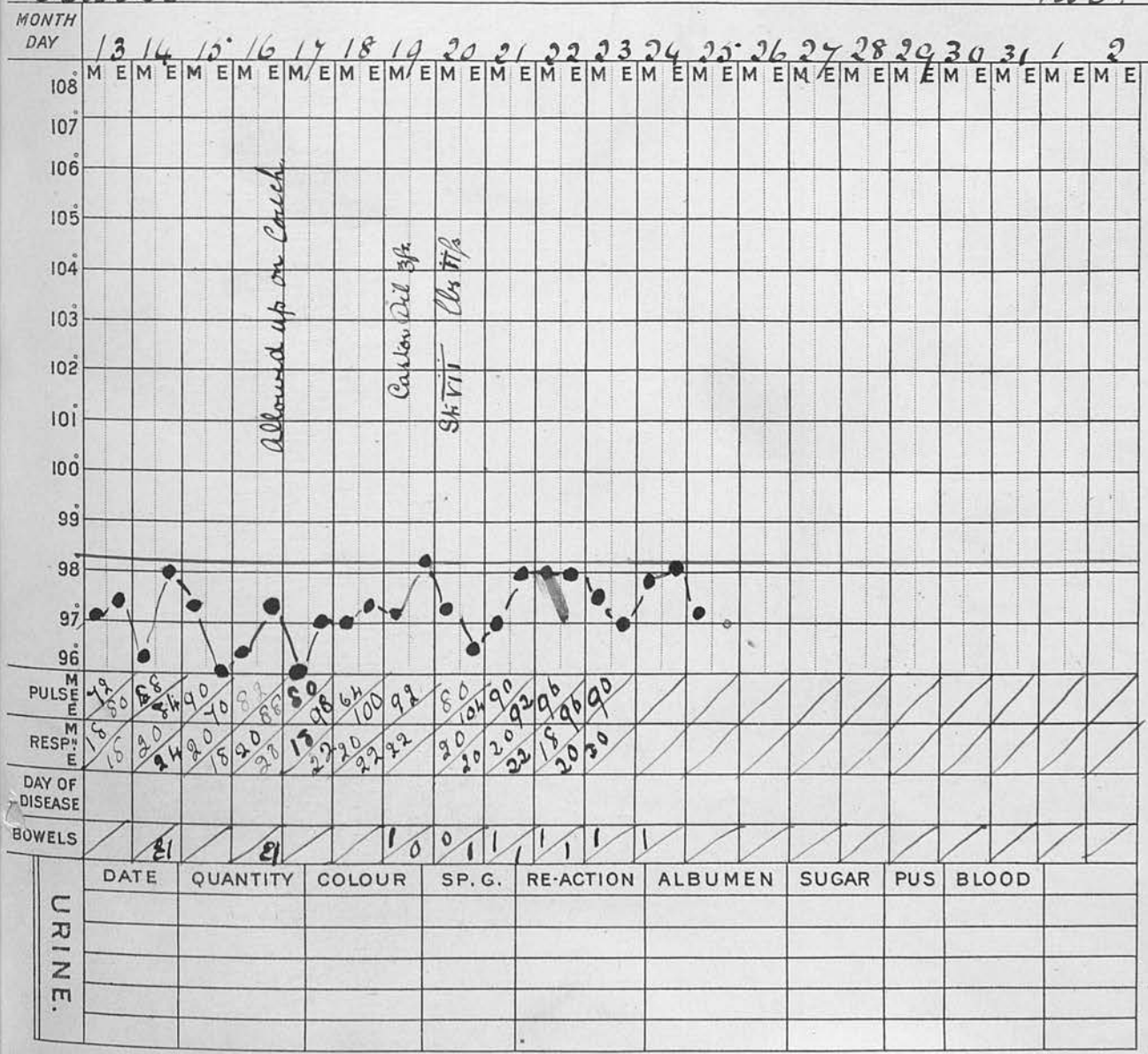
Patients Name Agnes Beck. Age 19

Disease

Discharged

October

Nov.



URINE.

DATE	QUANTITY	COLOUR	SP. G.	RE-ACTION	ALBUMEN	SUGAR	PUS	BLOOD	

DR. PETCH.

In Register. WARD 6

me Elizabeth Brown.

e 21 Occupn.

sidence 7 Johns St. Mill Lane.

Recomd. by

Date of { Admission Aug 29. 1904.
Discharge October 22. 04

rd., Single, or Widod.

DISEASE. Enteric Fever.

Result C

DATE.	TREATMENT.	DATE.	DIET.
	Mist. Camph. Co. 3ss. every 4 hours.		Milk.
10.10.	Mist. Al. Bronchial. 3ij. 2.d.s. p.c.	12.10.	Low. c. Fish & Chicken.
			Egg.
14.10.	Ol Ricini 3ss. 2.o.s.	15.10.	Custard.
		18.10.	Cauliflower. Stewed Apples.

2
30
22
54

0.—4.—1903.

Physician Jr. Petch

Admitted Aug 29. 04

Patients Name Elizabeth Brown

Age 20.

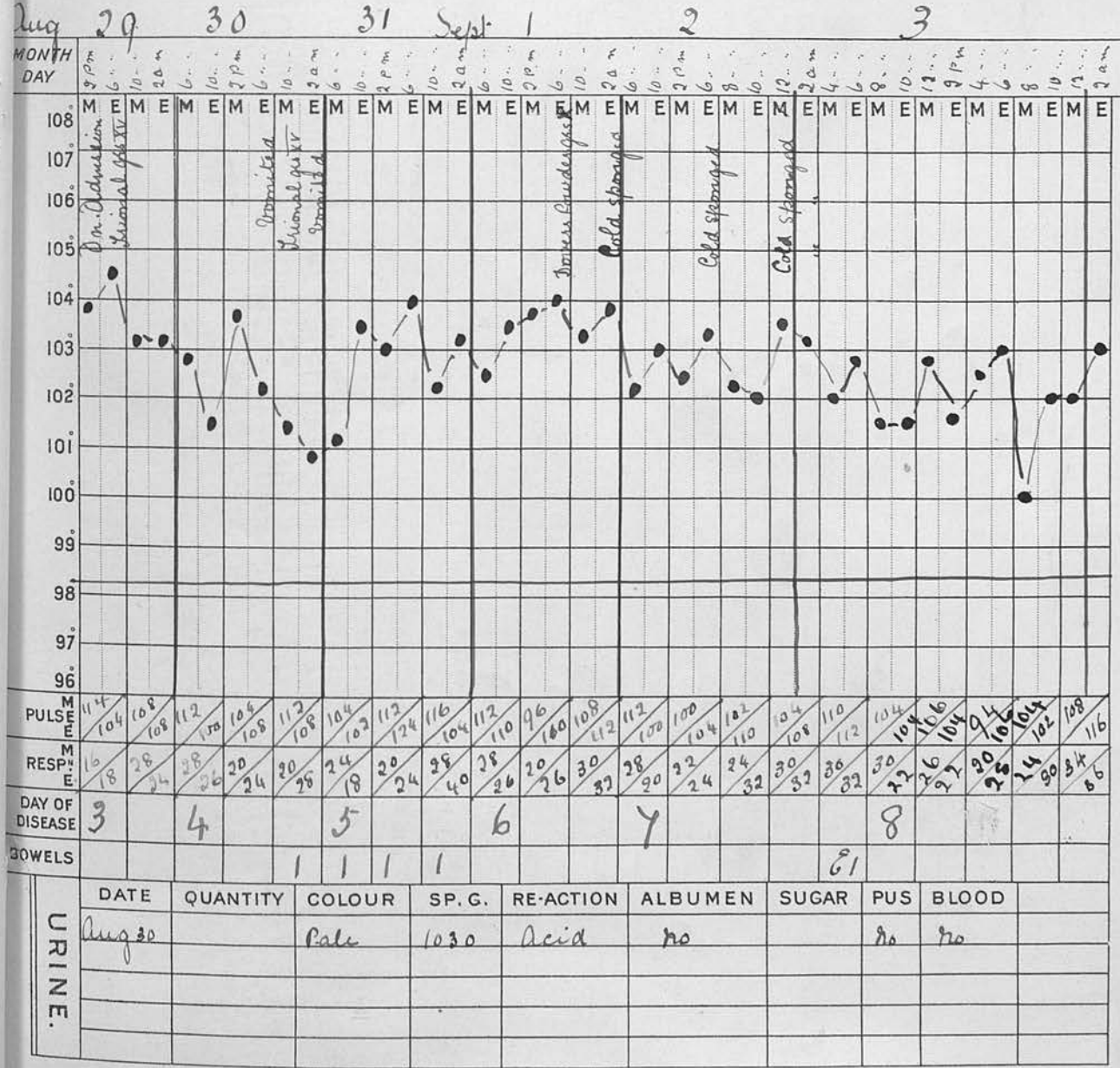
Disease

Discharged

---

delirious in evenings. for 1st week.

Icebag to abdomen & "Cradled" on Sept 1st



URINE.	DATE	QUANTITY	COLOUR	SP. G.	RE-ACTION	ALBUMEN	SUGAR	PUS	BLOOD	
	Aug 30		Pale	1030	Acid	no		No	no	

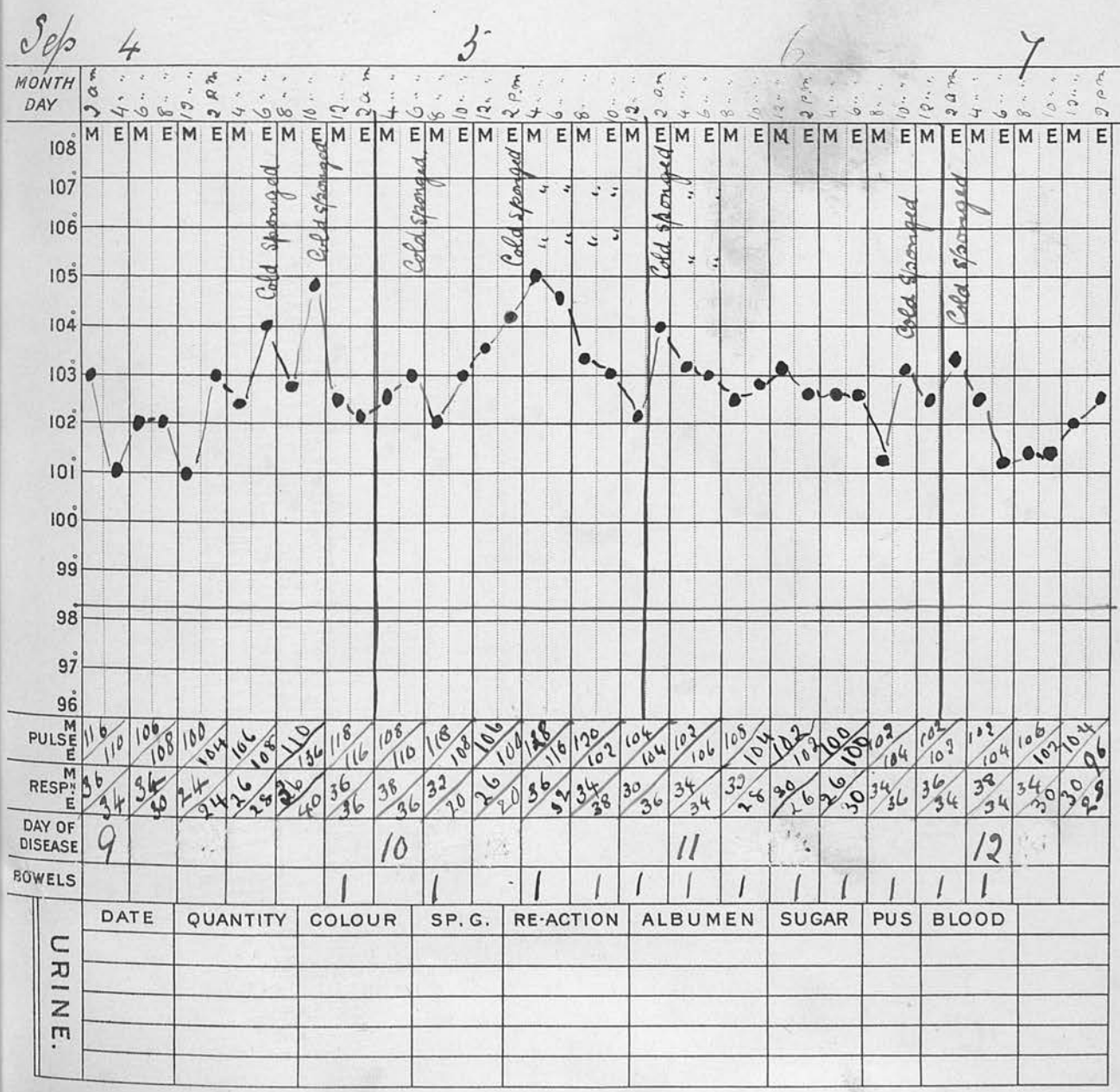
Physician Dr Veitch

Patients Name Elizabeth Brown Age 20

Disease

Admitted Aug. 29 = 1909

Discharged



Physician Dr Pelch

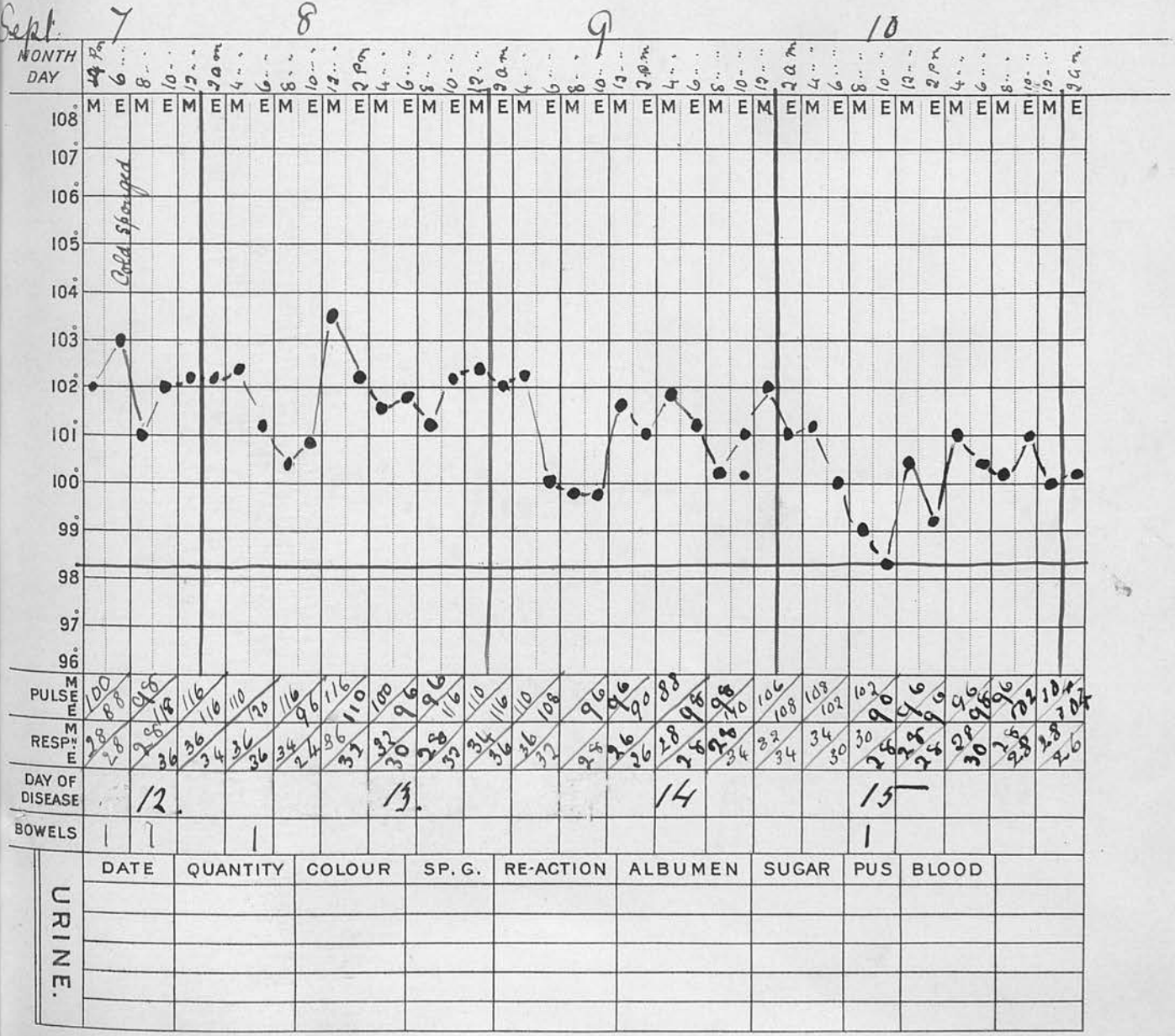
Admitted Aug 29. 04

Patients Name Elizabeth Brown

Age 20

Disease

Discharged



Physician Dr Petch

Admitted Aug 29 = 1904

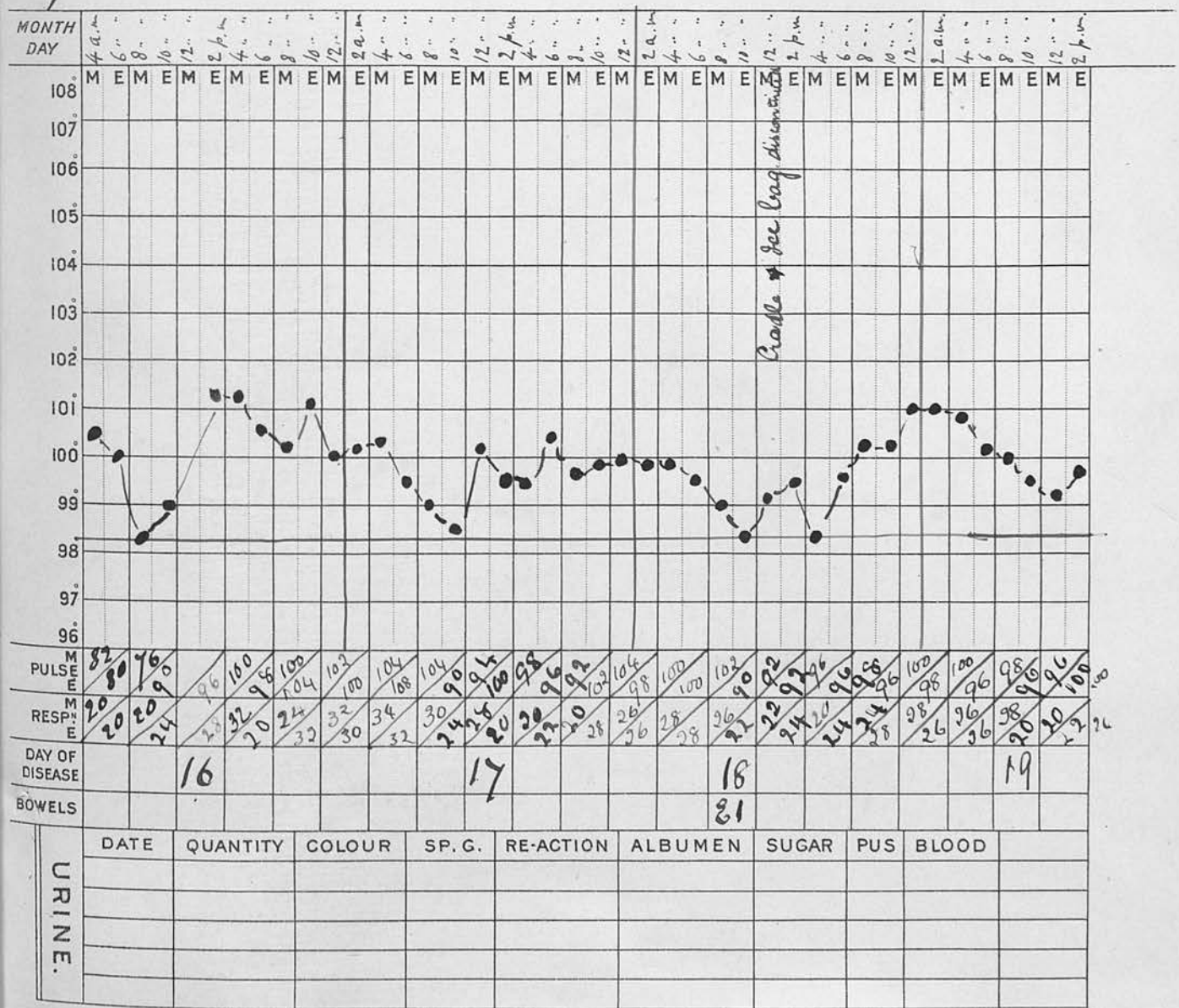
Patients Name Elizabeth Brown

Age 20

Disease

Discharged

Sep. 11 12 13 14



URINE.

DATE	QUANTITY	COLOUR	SP. G.	RE-ACTION	ALBUMEN	SUGAR	PUS	BLOOD	

Physician Dr. Petch

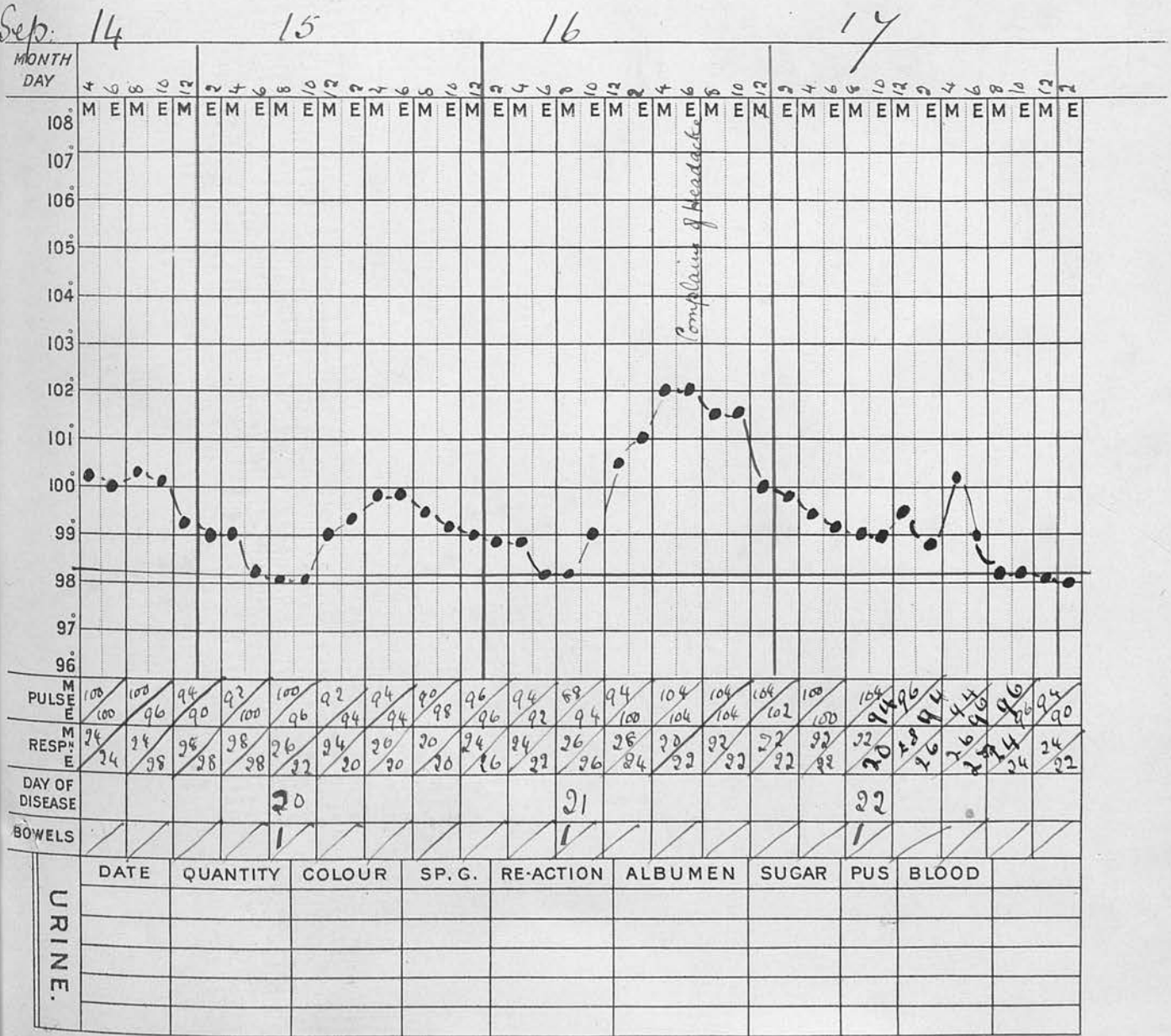
Admitted Aug: 29.04

Patients Name Elizabeth Brown

Age 20.

Disease

Discharged



Physician Dr. Petch

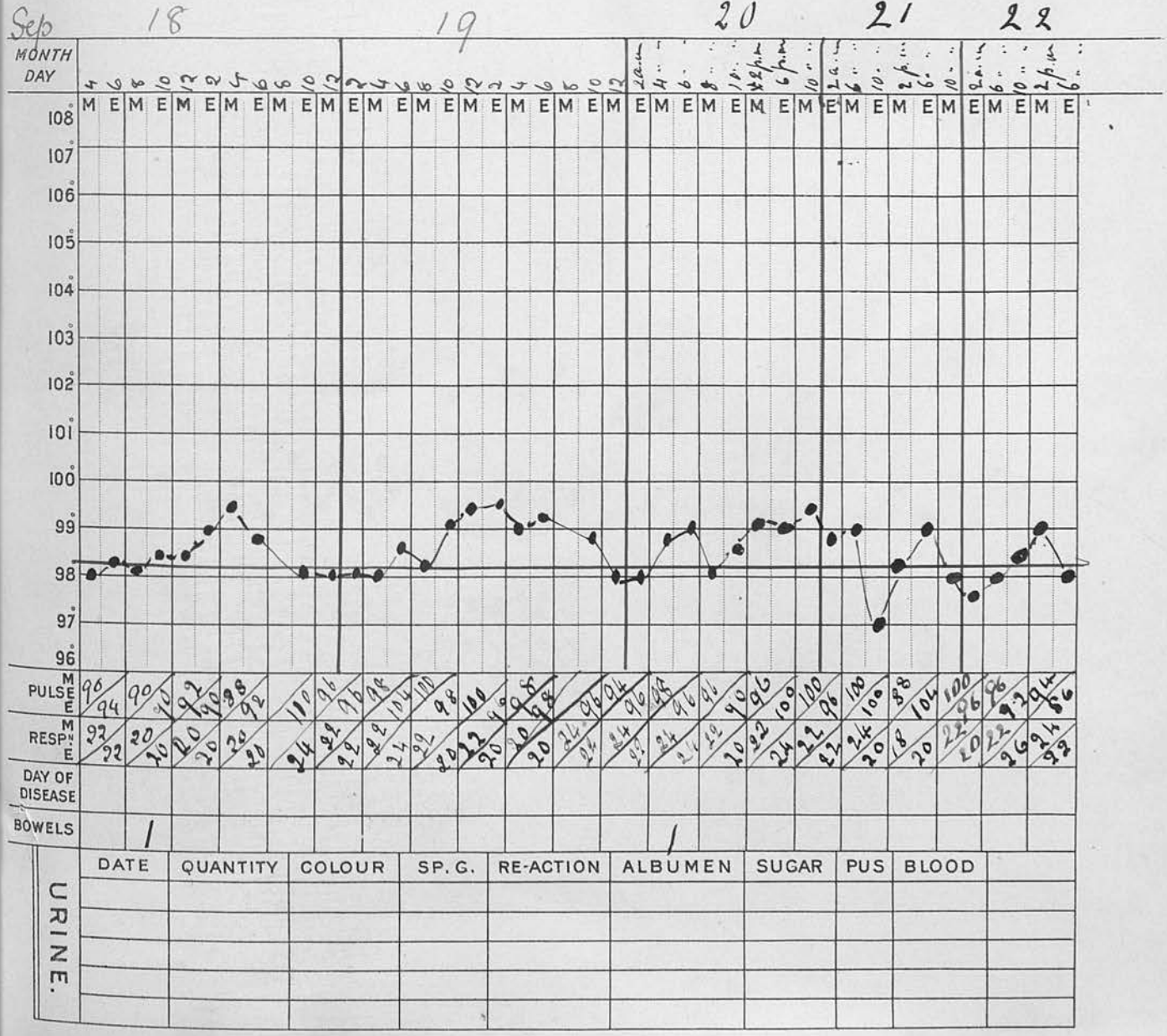
Admitted
Aug. 29. 04

Patients Name Elizabeth Brown

Age 20

Disease

Discharged



Admitted

Patient's Name Elizabeth Brown

Aug 29th 1904

Age 29

Disease

Discharged

Sep

MONTH		22			23						24						25						26						27						28						29		
DAY																																										
		P.M.			A.M.			P.M.			A.M.			P.M.			A.M.			P.M.			A.M.			P.M.			A.M.			P.M.			A.M.			P.M.			A.M.		
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PULSE		94	86	88	94	92	96	86	102	94	88	90	86	96	76	92	96	88	86	80	80	80	78	74	88	86	90	80	88	80	88	76	80	96	90	92	84	86	96	90	92	86	90	100	90
RESPN.		24	22	20	22	20	22	20	20	22	22	22	20	22	18	22	22	20	18	24	23	20	20	20	20	20	20	18	20	20	20	24	24	20	20	20	22	22	20	20	18	20	22	16	18
DAY OF DISEASE					†																																							
BOWELS						1																			El.																				

URINE.

DATE.	QUANTITY	COLOUR	SP. G.	RE-ACTION	ALBUMEN	SUGAR	PUS	BLOOD

2000—10/03—Yorks. Herald.

Admitted
Aug 29. 04

Patient's Name Elizabeth Brown

Age 21 Discharged

Disease

Sep Oct

MONTH																																			
DAY	29			30						1						2						3						4						5						6		
	P.M.			A.M.			P.M.			A.M.			P.M.			A.M.			P.M.			A.M.			P.M.			A.M.			P.M.			A.M.			P.M.			A.M.		
	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10
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RESPN.	16	18	20	18	18	18	18	16	20	18	18	20	20	20	20	18	18	20	20	20	20	20	18	20	18	20	18	18	18	20	20	18	20	20	18	18	18	18	20	20	20	18	18	20	18	20	20
DAY OF DISEASE																																											
BOWELS	21												21									1																		21					

URINE.

DATE.	QUANTITY	COLOUR	SP. G.	RE-ACTION	ALBUMEN	SUGAR	PUS	BLOOD

2000—10/03—Yorks. Herald.

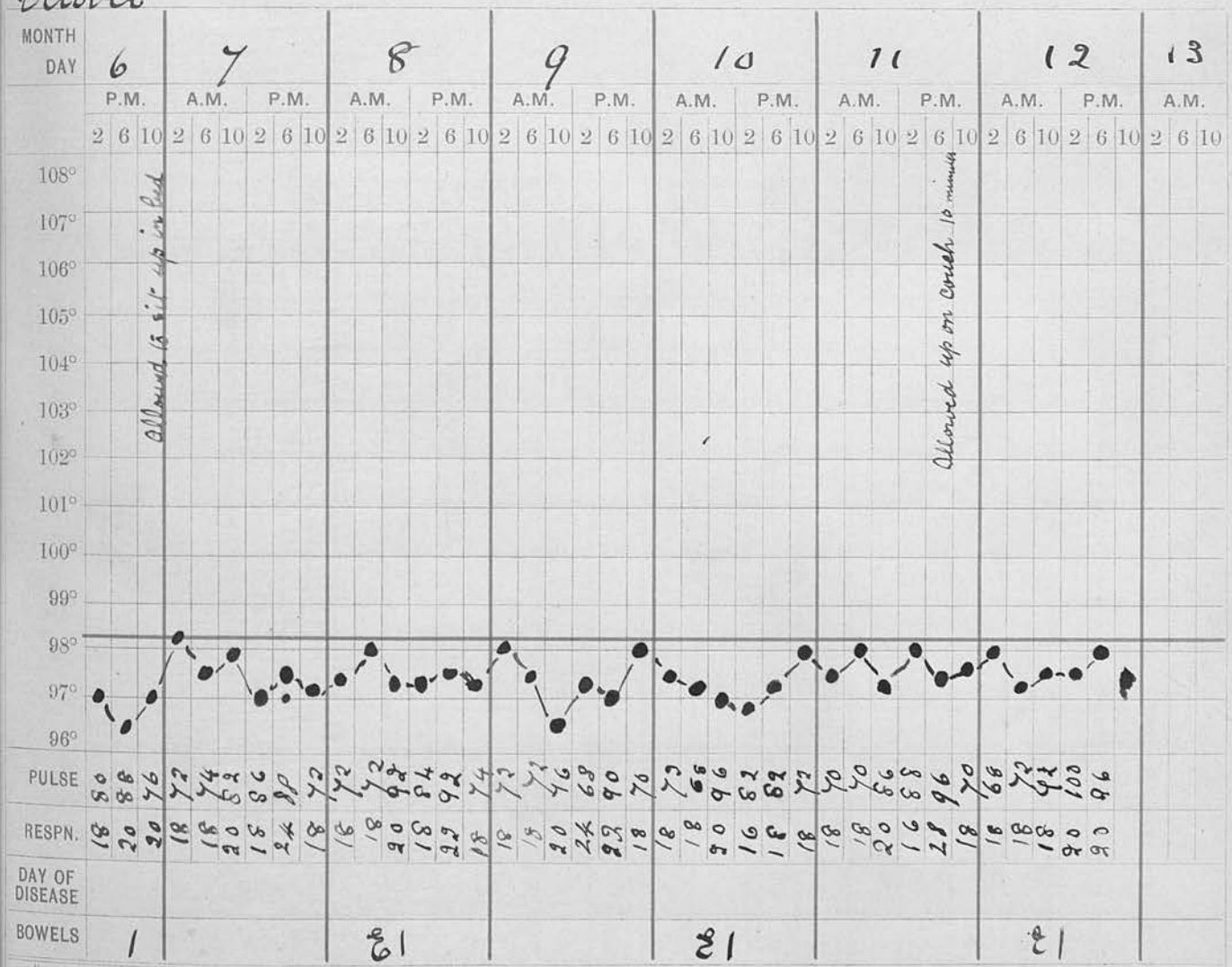
Admitted
Aug 29. 04

Patient's Name Elizabeth Brown

Age 21. Discharged

Disease

October



URINE.

DATE.	QUANTITY	COLOUR	SP. G.	RE-ACTION	ALBUMEN	SUGAR	PUS	BLOOD

2000—10/03—Yorks. Herald.

Physician Dr. Pelch

Admitted Aug 29. 04

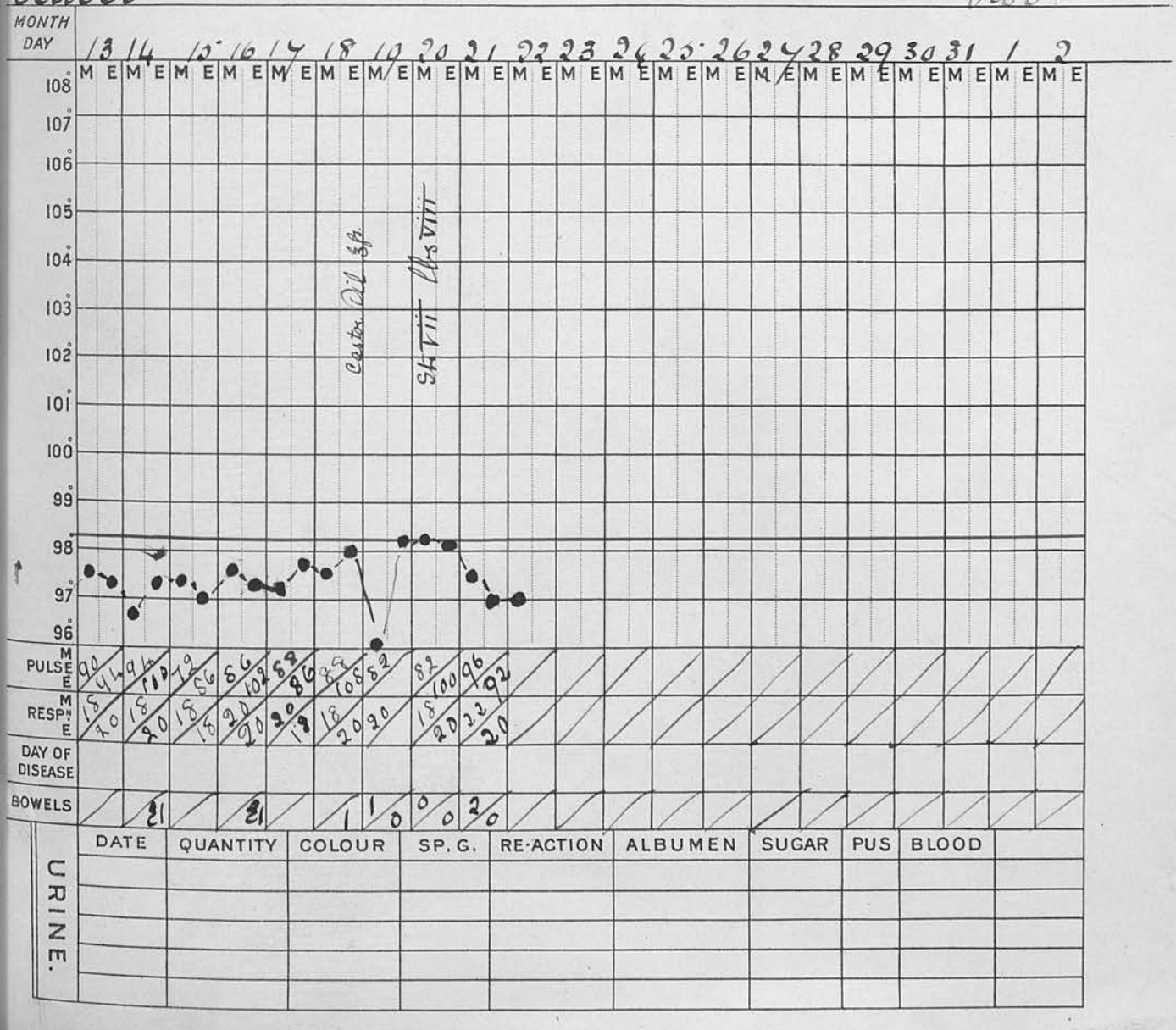
Patients Name Elizabeth Brown Age 21

Disease

Discharged

October

Nov.



URINE.

DATE	QUANTITY	COLOUR	SP. G.	RE-ACTION	ALBUMEN	SUGAR	PUS	BLOOD	

02 Copy.

Register.

DR. PETCH.

WARD. 6

Cooper alice

Recomd. by S. Robinson

14. Occupn. Domestic

Date of { Admission August 29th 1904

nce Kirk Catton Common, Stamford Bridge { Discharge October 12th 1904

DISEASE.

, Single, or Widod. | Enteric Fever. | Result C.

TE.	TREATMENT.	DATE.	DIET.
8.04.	℞ acetozone gr. x syr aurant- ℥ij.ss aq ad ℥j ℥iv Every 2 hours.	29.8.04.	Milk ℥iij p.d.
		3.10.	Rusks.
		6.10.	Benger's food
7.04.	.. Every 4 hours.		Bread crumb.
.04	.. l.d.s	12.10	Low.
.04	.. esp.	16.10	Milk
	—— .. —— .. ——		Chicken
.10.	Mist. ol. morrhuae ℥j.	23.10.	Medium
	l.d.s. p.c.		
.10.	" ℥ij		
	—— .. ——		

11—1902

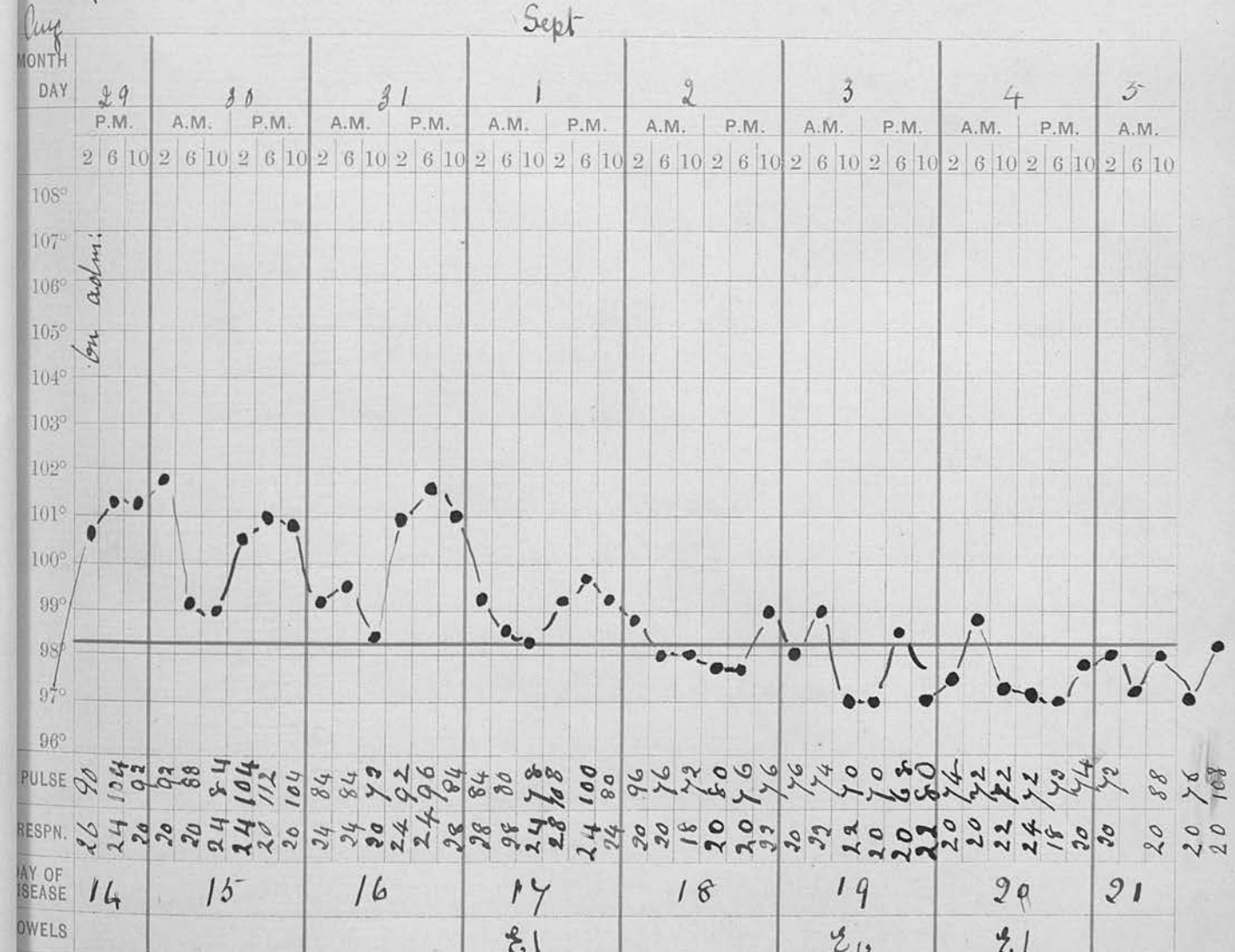
Admitted
Aug 29th 1904

Patient's Name Alice Cooper

Age 14 Discharged

Disease

14 day (approx).



URINE.

DATE.	QUANTITY	COLOUR	SP. G.	RE-ACTION	ALBUMEN	SUGAR	PUS	BLOOD
Aug 30		Amber	1020	Acid	No	No	No	No

2000—10/03—Yorks. Herald.

Admitted
Aug 29. 04

Patient's Name Alice Cooper

Age 14 Discharged

Disease

Sept

| MONTH | | 6 | | |

Patient's Name Alice Cooper

Admitted Aug 29. 04

Age 14

Disease

Discharged

Sep.

MONTH																																			
DAY	12			13						14						15						16						17						18						19		
	P.M.			A.M.			P.M.			A.M.			P.M.			A.M.			P.M.			A.M.			P.M.			A.M.			P.M.			A.M.			P.M.			A.M.		
	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10
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PULSE	92	90	94	92	94	92	90	90	94	92	92	84	92	96	92	92	94	90	96	94	96	92	94	90	68	80	72	74	92	80	64	70	72	74	92	84	64	70	72	72	74	70
RESPN.	24	20	20	20	20	18	18	20	20	20	18	24	22	20	20	20	20	20	20	24	24	22	20	20	20	20	20	20	20	20	18	20	20	20	20	18	18	20	20	18	20	18
DAY OF DISEASE																																										
BOWELS																																										

URINE.	DATE.	QUANTITY	COLOUR	SP. G.	RE-ACTION	ALBUMEN	SUGAR	PUS	BLOOD

2000—10/03—Yorks. Herald.

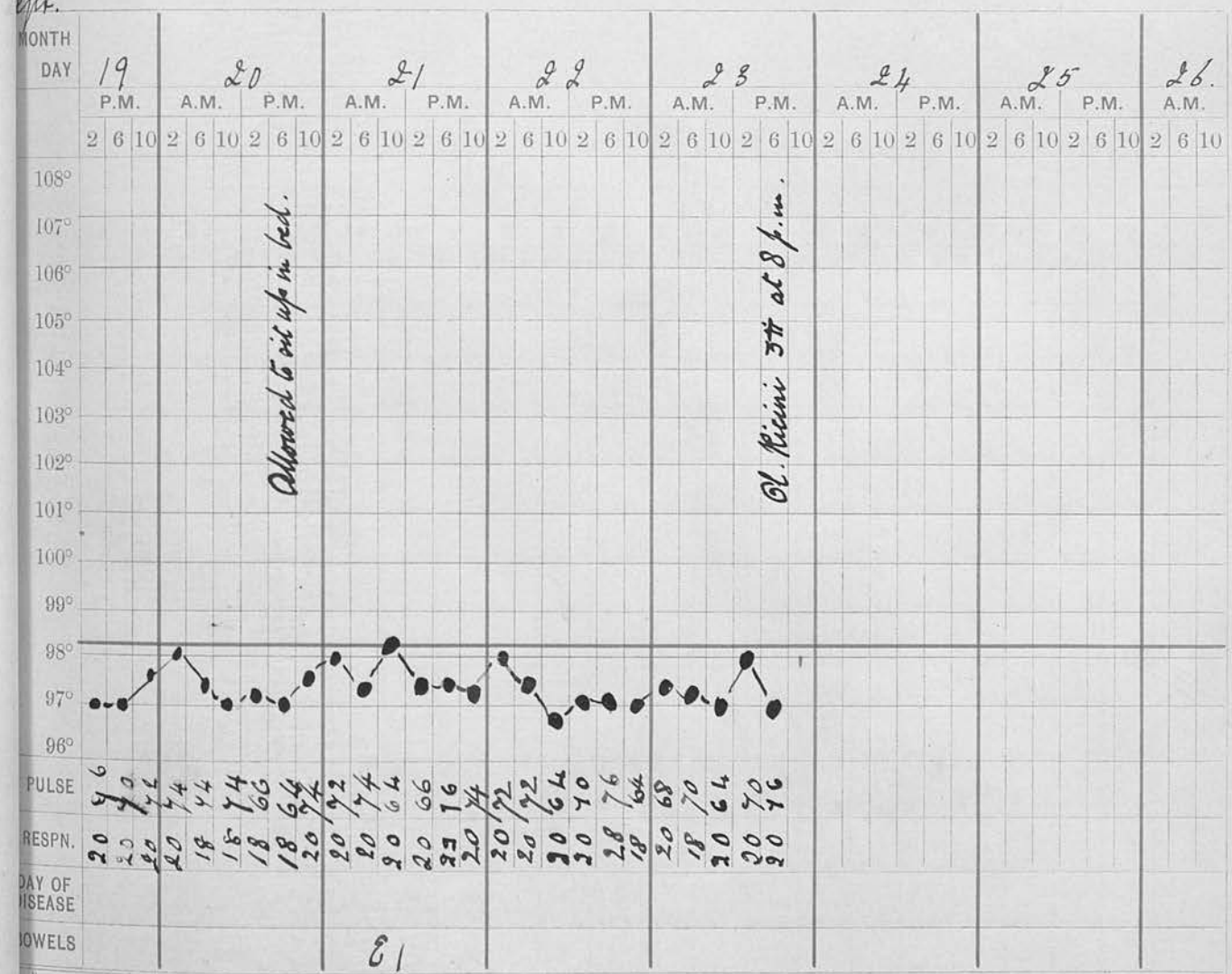
Admitted
Aug 29th 04

Patient's Name Alice Cooper

Age 14 Discharged

Disease

Left:



URINE.

DATE.	QUANTITY	COLOUR	SP. G.	RE-ACTION	ALBUMEN	SUGAR	PUS	BLOOD

2000—10/03—Yorks. Herald.

Physician Dr Petch

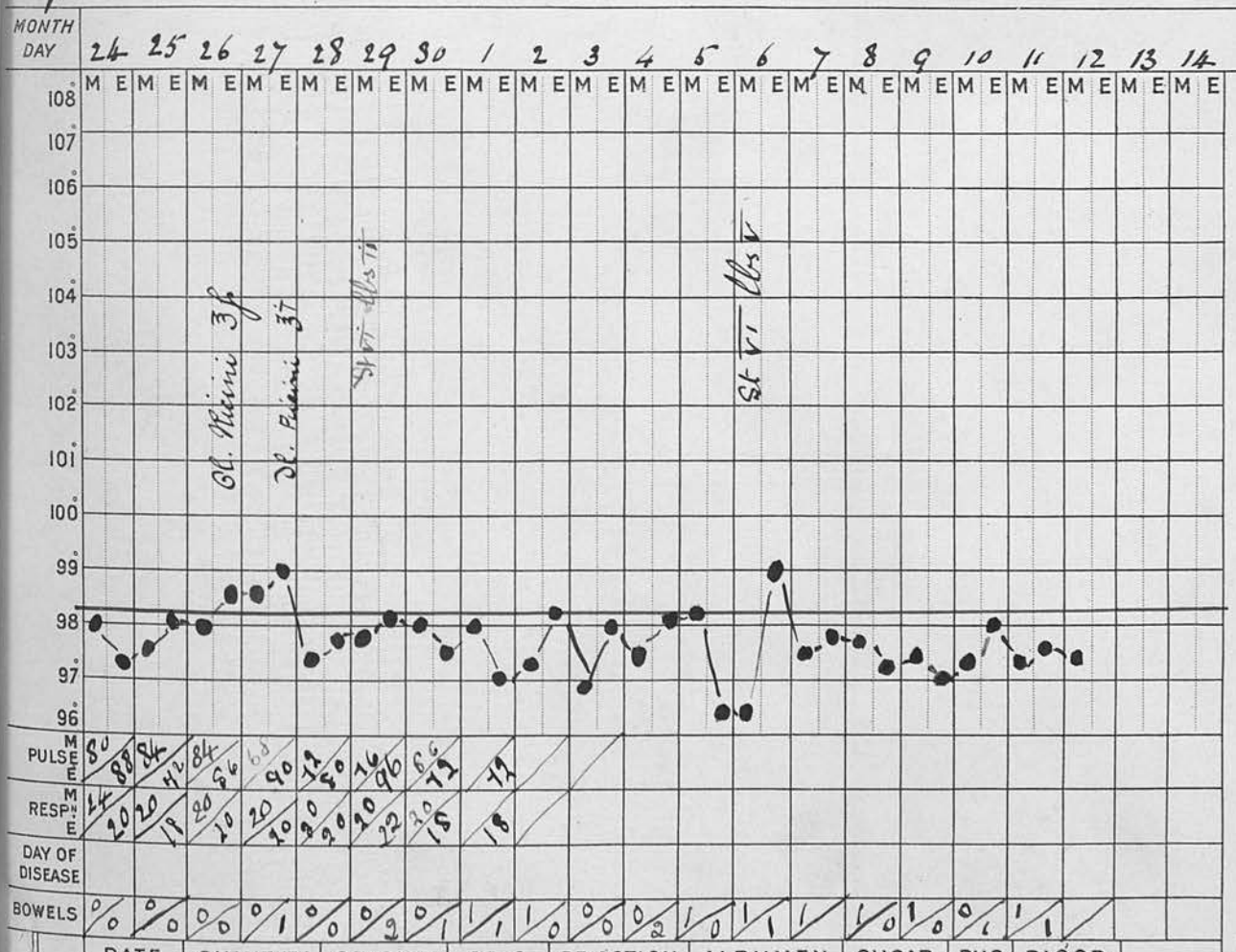
Patients Name Alice Cooper

Disease

Admitted Aug. 29 - 1904

Age 14 Discharged

Sep. Oct.



URINE.	DATE	QUANTITY	COLOUR	SP. G.	RE-ACTION	ALBUMEN	SUGAR	PUS	BLOOD

916 In Register. Copy

DR. PETCH.

WARD. 3

ne Wood George William | Recomd. by A. Mountain

35 Occupn. Blacksmith | Date of Admission Sept. 2nd 1904

idence 6 Upper St. Pauls Terrace. Holyate Road | Discharge Nov. 19th 04

rd., Single, or Widod. | DISEASE. Enteric Fever | Result C.

DATE.	TREATMENT.	DATE.	DIET.
9.04.	Rx. Acidozone fl ℥xv Syr Aurant. ℥ iiss Aq ad ʒj ℥ iv every 2 hours	2.9.04.	Milk ʒ iij p.d.
9.04	Adrenalin Chloride 1-1000 mx every 4 hours. 13.9. stop .. .	20.9.	Mellins Food Rusks.
		23.9.	Beef Tea or Bovril B.i.d.
10.04.	Acidozone fl x 2 hrly. " " 4 hrly " " t.d.s 17.10. stop	6.10.	Boiled Chicken Low diet.
10.		18.10	Medium
10.			
10.			
	Ol Ricini ℥ss. S.O.S. ..		
	Mist. ol Bronchus ℥j. t.d.s. p.c.		
31.10.	Mist. ol Bronchus. ʒ ij t.d.s. p.c. .. .		

Dr. Petch

Patient's Name Geo. Wm Wood

Admitted Sept. 2-04

Age 35 Discharged

Disease

This pat: was very emaciated and anaemic on admission & suffered from chill & delirium for four nights

Sept.

	DATE.	QUANTITY	COLOUR	SP. G.	RE-ACTION	ALBUMEN	SUGAR	PUS	BLOOD
URINE.	Sept. 4			1020	Acid	clear.			
	7	Pale		1020	Acid.	clear.			

Phos.

2000—10/03—Yorks. Herald.

Dr. Petch

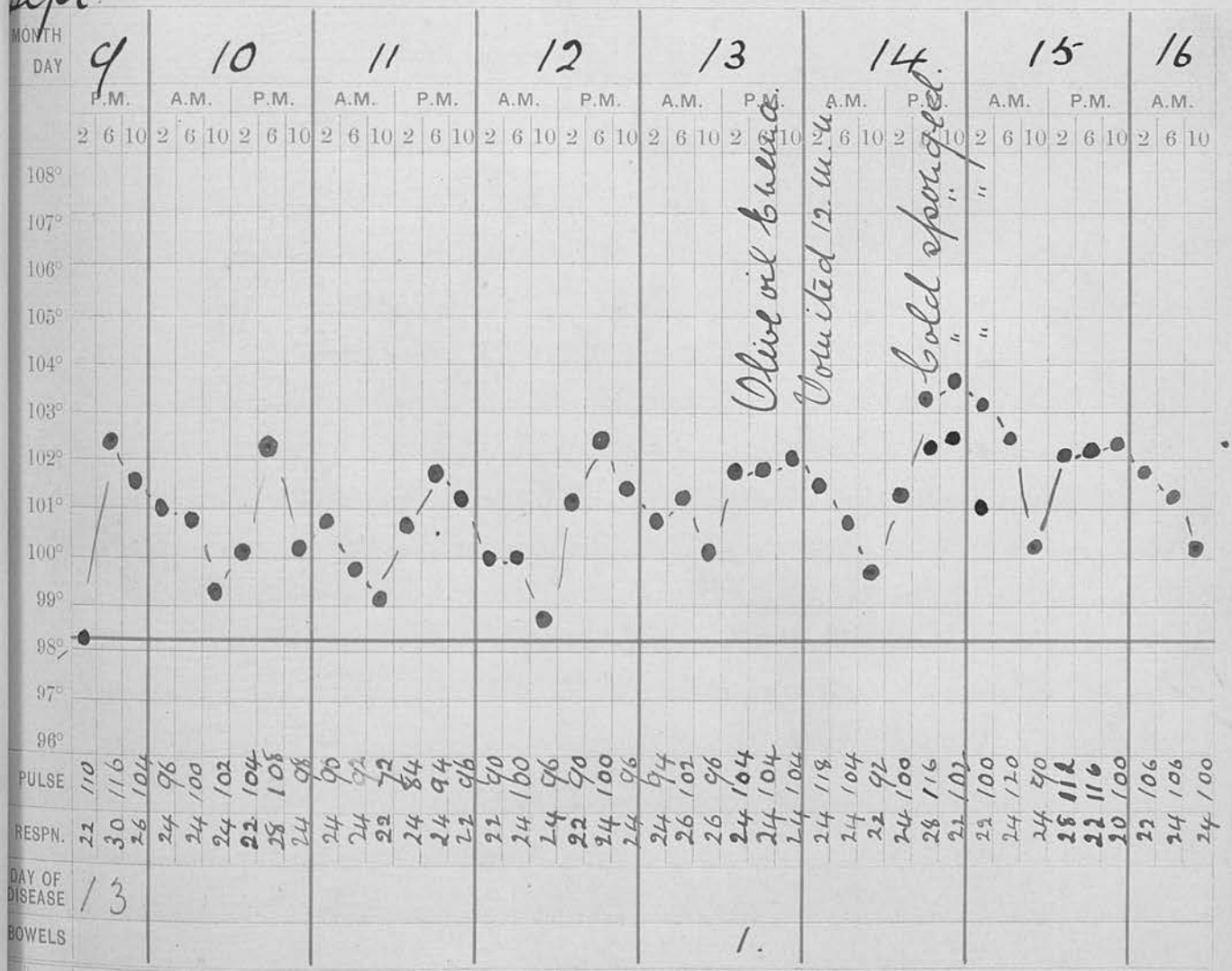
Patient's Name Geo. Wm Wood

Admitted Sept 2. 04

Age 35 Discharged

Disease

Sept.



URINE.

DATE.	QUANTITY	COLOUR	SP. G.	RE-ACTION	ALBUMEN	SUGAR	PUS	BLOOD

2000—10/03—Yorks. Herald.

Dr. Petch

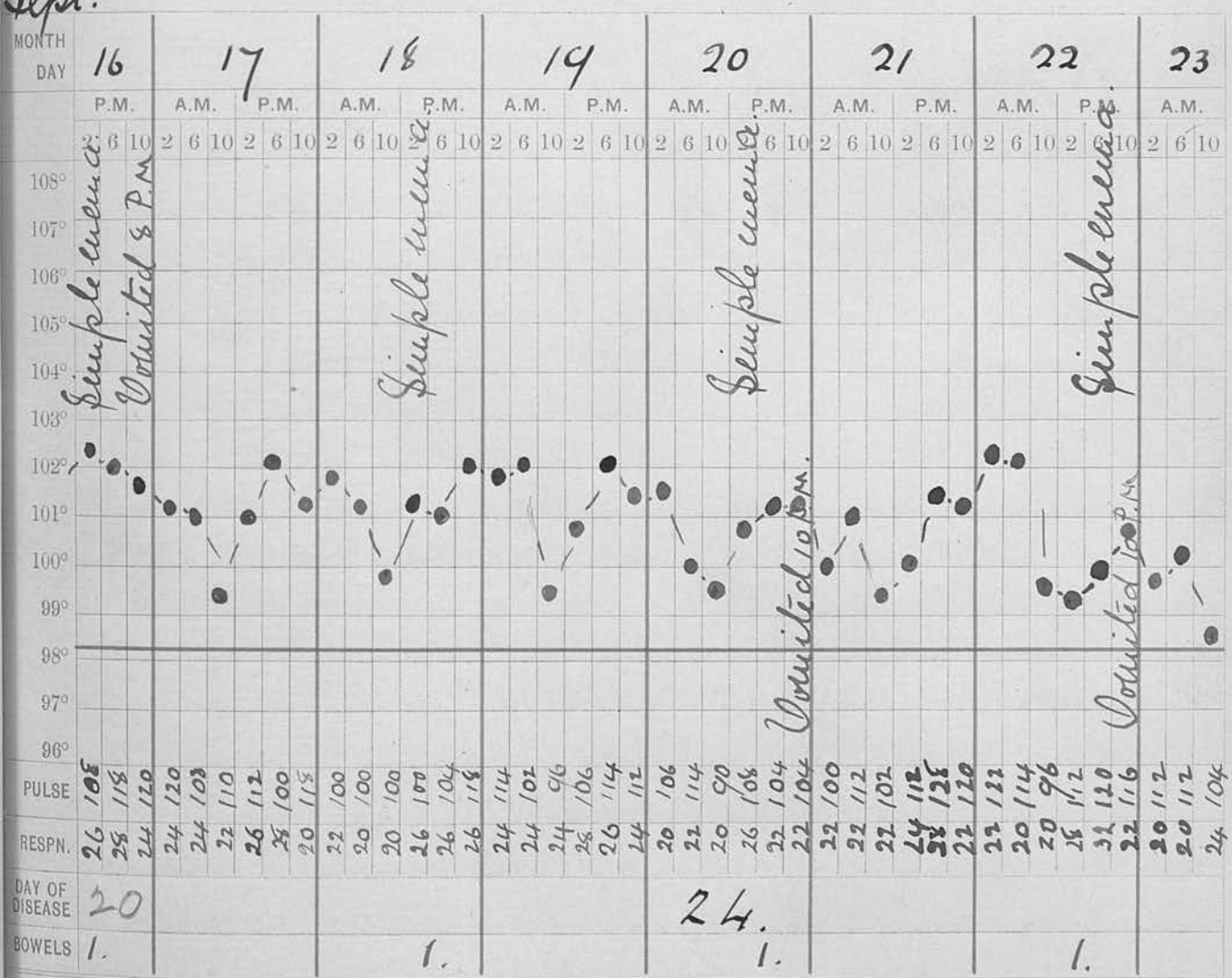
Patient's Name Geo. Wm. Wood

Admitted Sept: 2. 04

Age 35 Discharged

Disease

Sept:



URINE.

DATE.	QUANTITY	COLOUR	SP. G.	RE-ACTION	ALBUMEN	SUGAR	PUS	BLOOD
Sept 17		Normal	1015	Neutral	Trace			a little
" 18		Pale	1014	Alk.	Trace			" "
" 19		Pale	1015	Acid.	Trace			" "
" 20		Pale	1015	Acid.	Trace			" "
" 21		Pale	1015					
" 22		Pale	1012	Acid	Trace			∫ tr.

2000—10/03—Yorks. Herald.

1

Patient's Name Dr. Petch
Geo. W. Wood

Admitted Sept 2. 04

Age 35 Discharged

Disease

Sept.

MONTH		23			24						25						26						27						28						29						30		
DAY																																										
		P.M.			A.M.			P.M.			A.M.			P.M.			A.M.			P.M.			A.M.			P.M.			A.M.			P.M.			A.M.			P.M.			A.M.		
		2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10
PULSE		112	112	102	100	96	92	120	120	118	112	110	108	104	120	116	116	118	104	116	120	106	118	114	108	120	128	108	118	112	108	112	116	114	120	118	100	100	120	116	120	116	96
RESPN.		24	24	22	22	20	24	20	22	20	20	20	20	22	20	22	20	22	18	20	24	20	20	20	18	20	24	20	22	20	24	18	20	20	20	20	16	16	20	20	20	20	20
DAY OF DISEASE		27																																								
BOWELS						1.									1						1.																						

Vomited 10 P.M.

Simple vomit

Simple vomit. Hyp. morph. gr. 1/6 Atrop. gr. 1/100 6 P.M.

Vomited 12 midn.

4 P.M. "

2 A.M. "

Simple vomit

Vomited 10 P.M.

URINE.

DATE.	QUANTITY	COLOUR	SP. G.	RE-ACTION	ALBUMEN	SUGAR	PUS	BLOOD
Sept. 24		Pale	1014	Acid	Trace			Trace.
" 26		Pale	1014	Acid	Trace			Trace.
" 27		Pale	1014	Acid	Trace			Trace
" 28		Pale	1014	Acid	Trace			Trace.
" 29		Pale	1014	Acid	Trace			Trace.
" 30		Pale	1014	Acid	Trace			Trace.

2000—10/03—Yorks. Herald.

Dr. Pelch

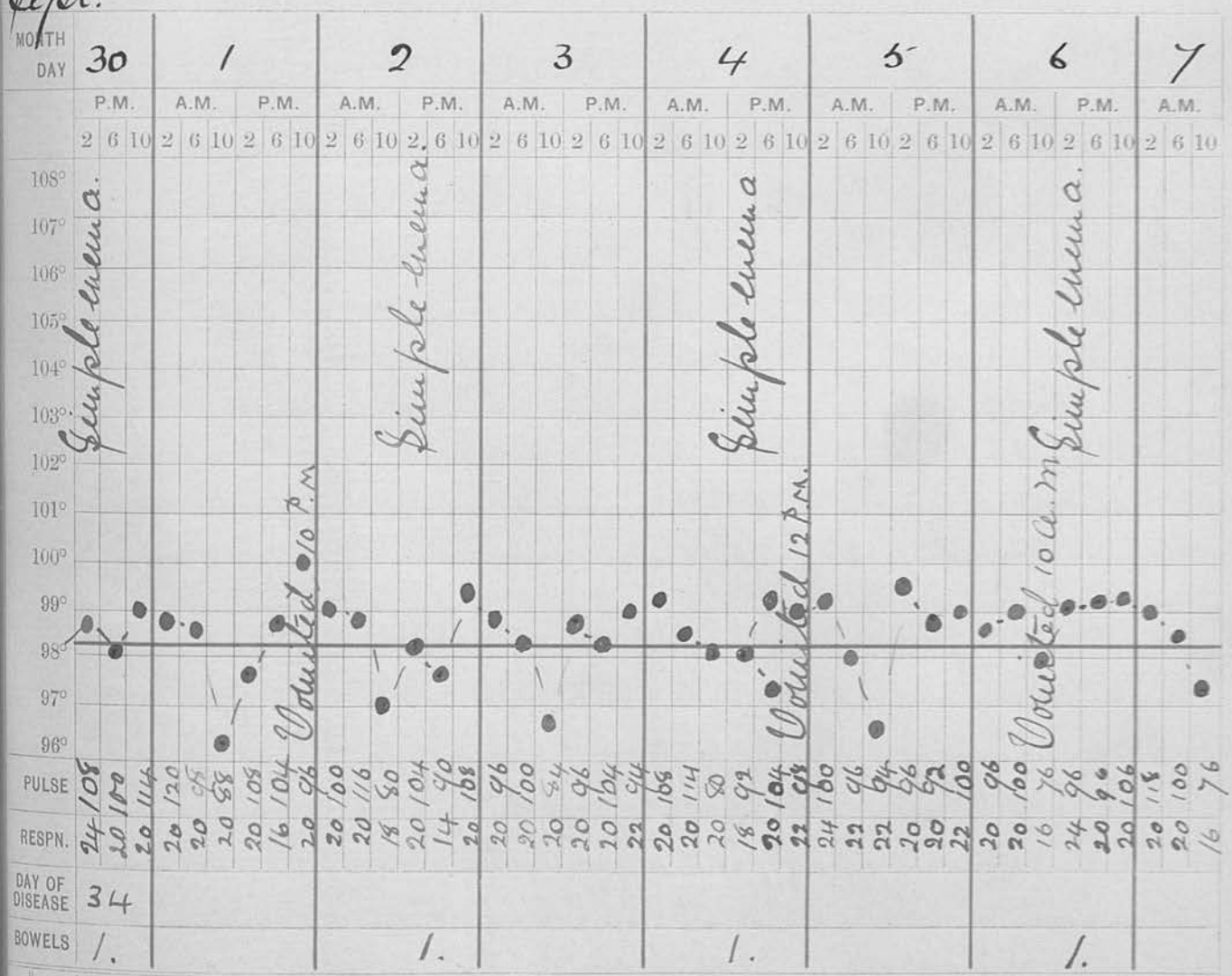
Patient's Name Geo. Wm Wood

Admitted Sept. 2-04

Age 35 Discharged

Disease

Sept.



URINE

DATE.	QUANTITY	COLOUR	SP. G.	RE-ACTION	ALBUMEN	SUGAR	PUS	BLOOD
Oct 1st		Pale	1012	Acid	Trace			Trace.
" 2		Pale	1015	Acid	Trace			Trace
" 3		Pale	1012	Acid	F. Trace			Trace.
" 4		Pale	1012	Acid	F. Trace.			Trace.
" 5		Pale	1015	Acid	F. Trace.			
" 7		Pale	1	Acid	F. Trace.			Trace.

2000—10/03—Yorks. Herald.

Dr. Petch

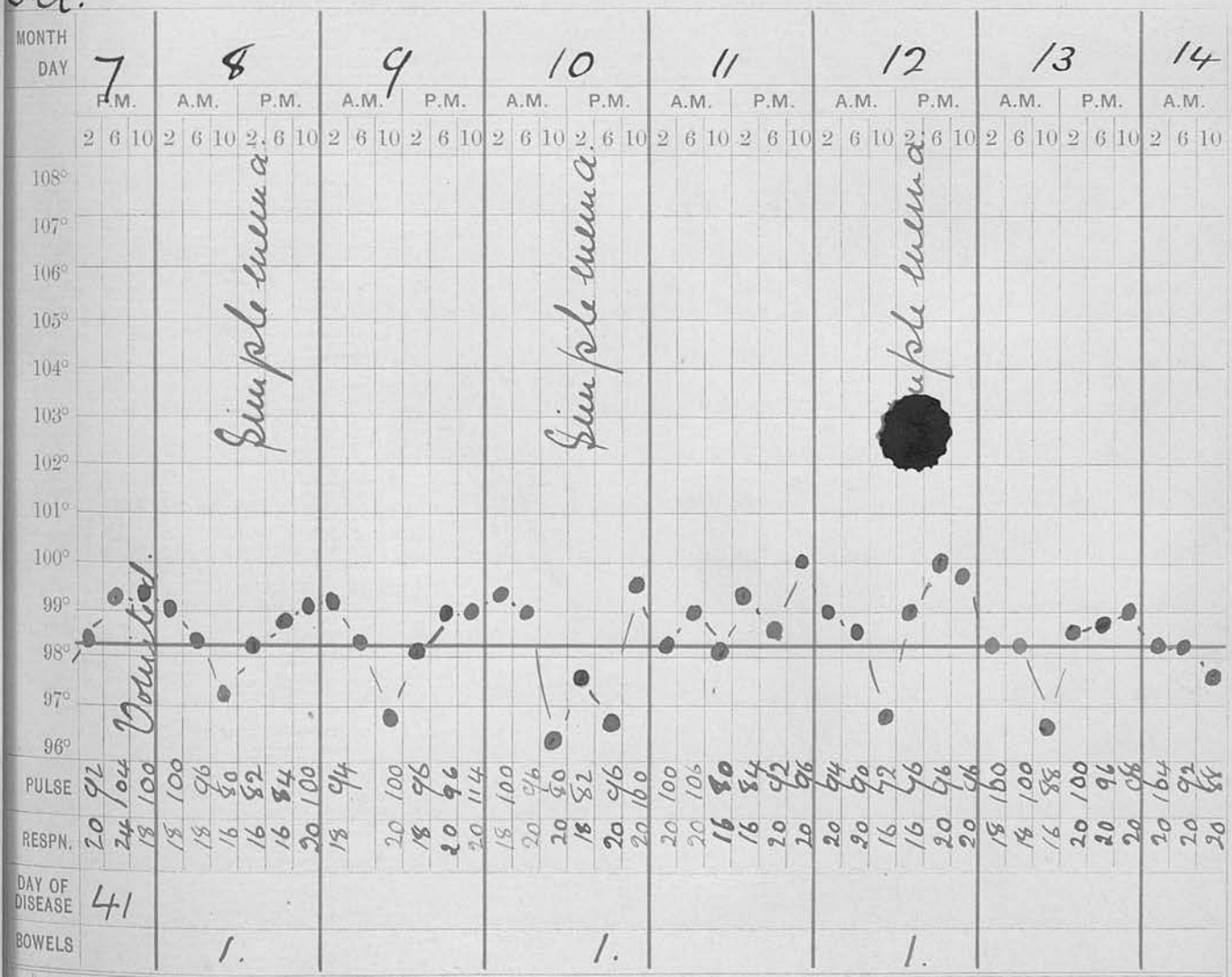
Patient's Name Geo. Wm Wood

Admitted Sept. 2. 04

Age 35 Discharged

Disease

Oct.



URINE.

DATE.	QUANTITY	COLOUR	SP. G.	RE-ACTION	ALBUMEN	SUGAR	PUS	BLOOD
Oct 11		Pale		Acid	clear.			

2000—10/03—Yorks. Herald.

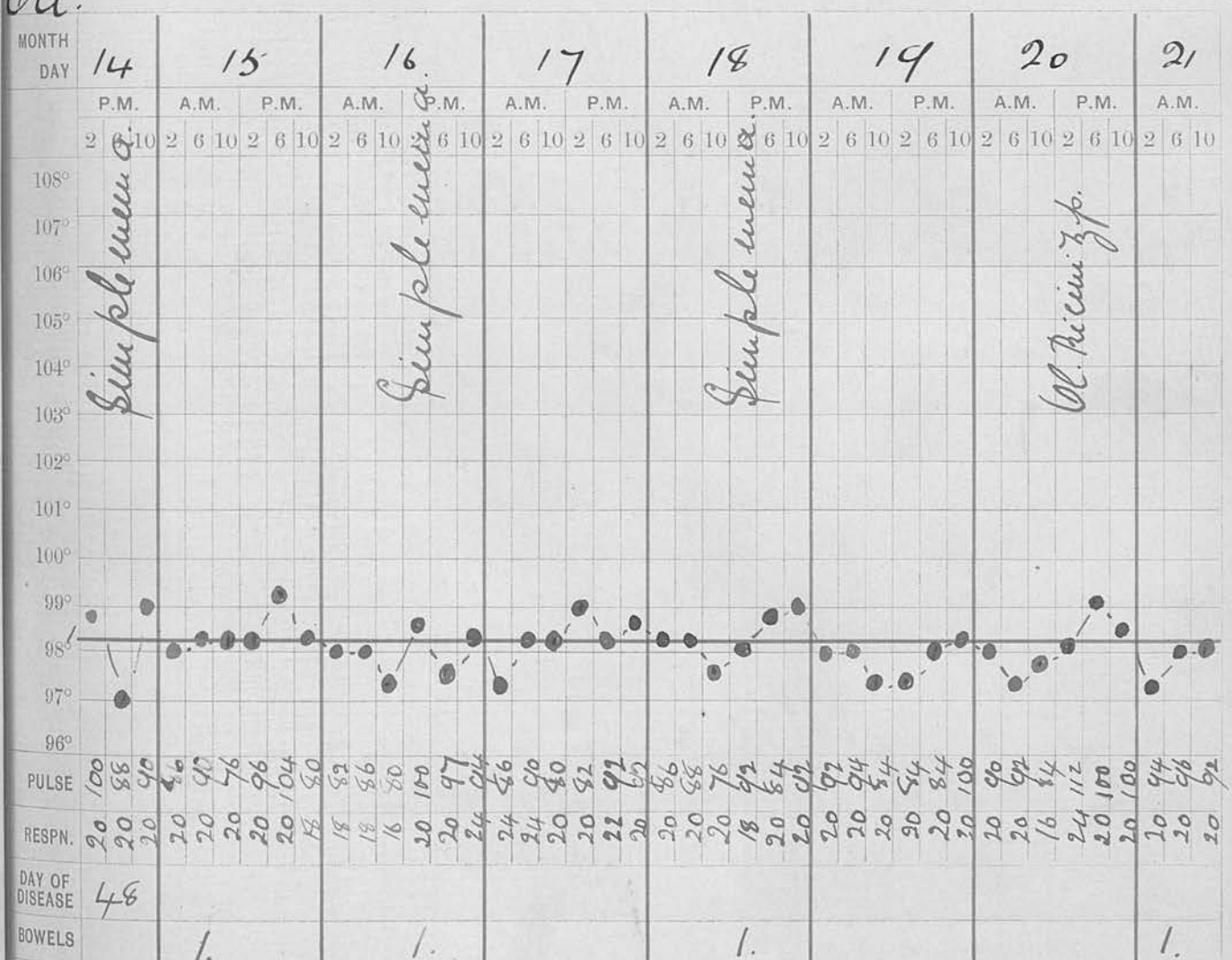
Patient's Name Geo. Wm. Wood — Dr. Petch

Admitted Sept. 2-04

Age 35 — Discharged

Disease

Oct.



URINE.

DATE.	QUANTITY	COLOUR	SP. G.	RE-ACTION	ALBUMEN	SUGAR	PUS	BLOOD
Oct 18		Normal	1014	Acid	clear.			

2000—10/03—Yorks. Herald.

Physician Dr. Pelch

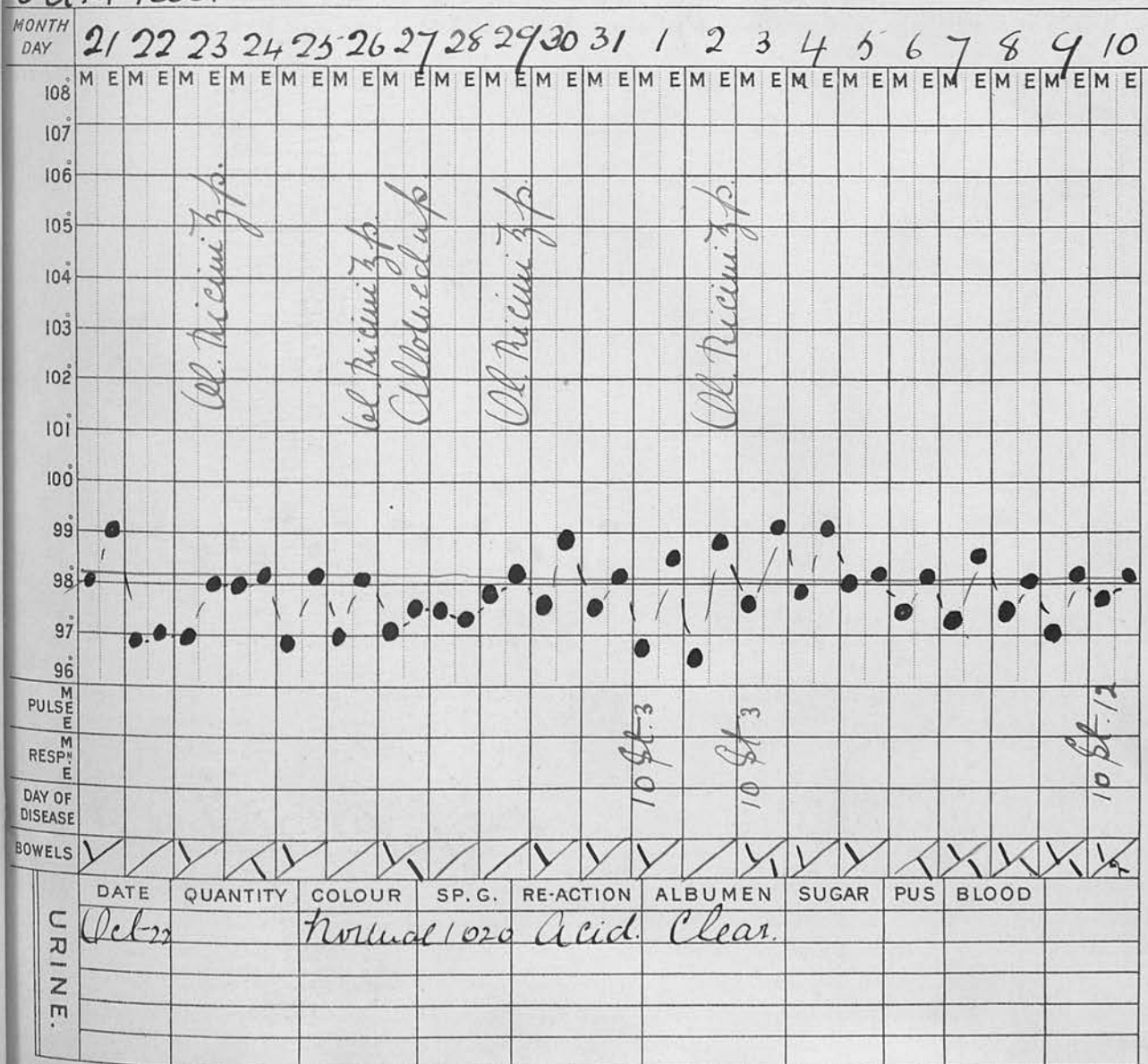
Admitted Sept 2. 04

Patients Name Geo. Wm Wood Age 35

Disease

Discharged

Oct 22 how.



URINE.

DATE	QUANTITY	COLOUR	SP. G.	RE-ACTION	ALBUMEN	SUGAR	PUS	BLOOD	
Oct 22		Normal	1020	Acid.	Clear.				

Physician Dr Petch

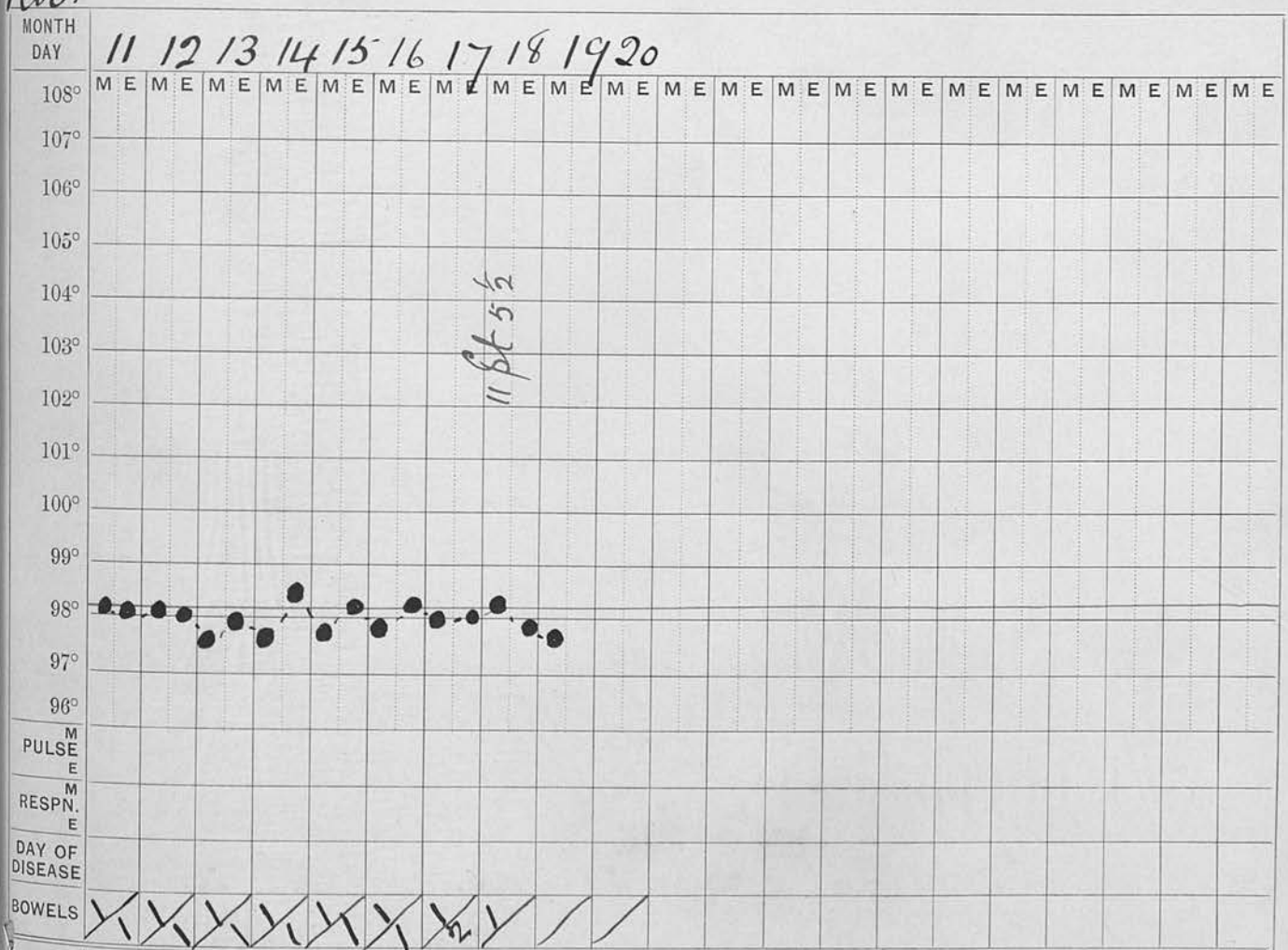
Patient's Name Geo. Wm Wood

Admitted Sept 2-04

Age 35 Discharged

Disease

Nov.



URINE.

DATE	QUANTITY	COLOUR	SP. G.	RE-ACTION	ALBUMEN	SUGAR	PUS	BLOOD	

1000—10/04—Yorks. Herald.

967. In Register.

DR. TURNER.

WARD. 6

Name Cooper Maria

Age 30 Occupn. Some

Residence Graves Yard. Gungate

Recomd. by N. Leetham & Sons

Date of Admission September 16th 1904

Date of Discharge Dec. 11. 04

Married, Single, or Widod.

DISEASE. Enteric Fever.

Result C.

DATE.	TREATMENT.	DATE.	DIET.
9.04.	℞ Acetozone gr X Lyc Aurantii ℥ij ℥ss Aq ad ʒj ℥iv Every 2 hours. — . — Brist. Compd Co ℥j Every 4 hours 25.9. t.d.s — " — " —	16.9.	Milk ʒiij p.d.
		28.9.	Benger's Mellins Foods.
		30.9	Milk ʒiij p.d. Peptonised.
		30.10	Benger's or Mellin's Food Rusks.
7.9.	Acetozone. Every 4 hours. — " —	3.11.	Low.
0.9.	Acetozone Every 2 hours.	10.11	Fish. Chicken.
5.10.	" " 4 hours	24.11.	Dietetics
9.10.	" " t.d.s		Milk ʒj Extra.
1.10.	Brist. Al. Bromide ℥j 3.11. Stop t.d.s. p.c.		
3.11.	Increase Al. Brom. ad ℥ij		
9.11.	Al Rubini ℥ss S.O.S — " —		

Milk Diet Sheet

1—11.—1903.

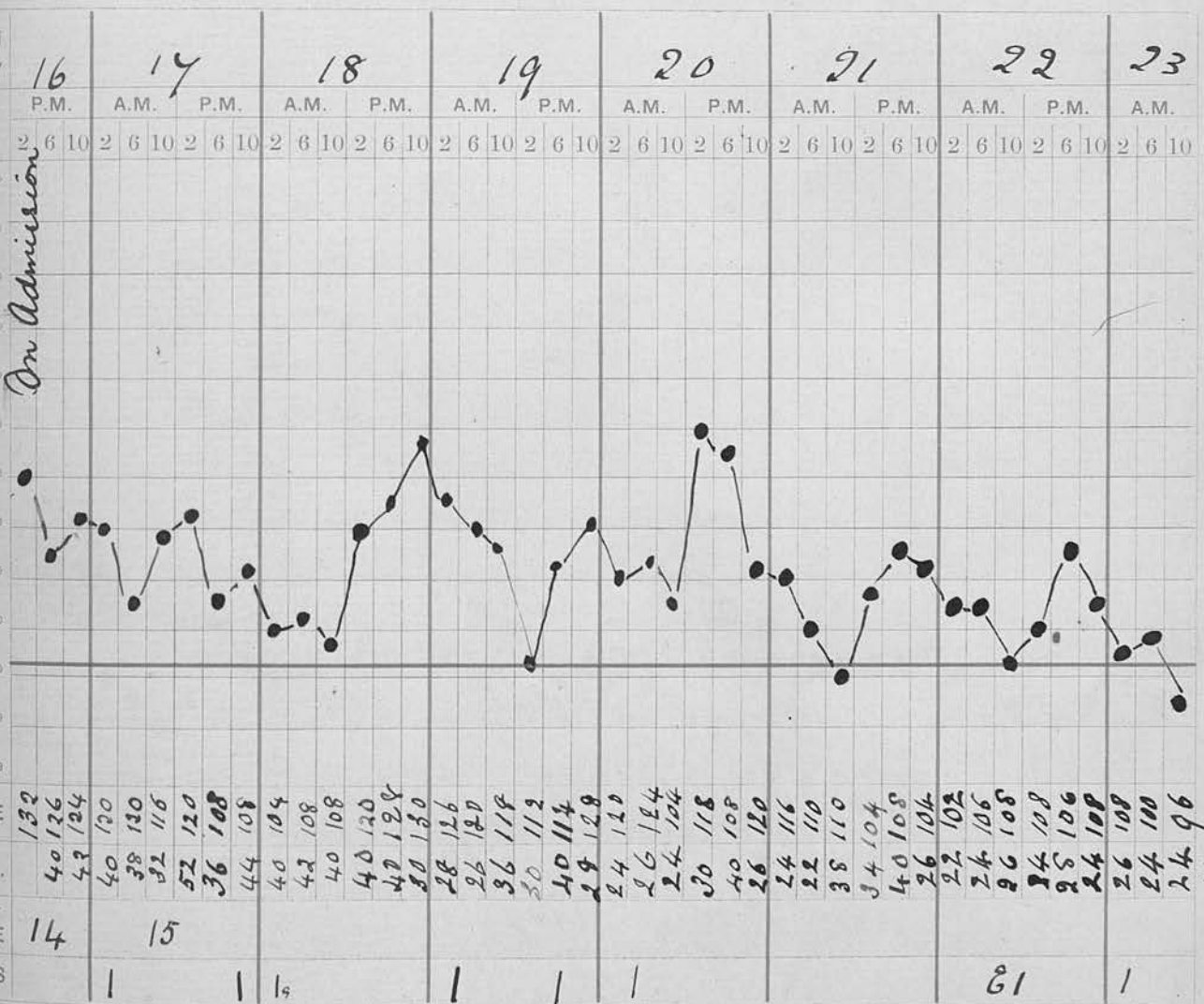
Admitted
Sep: 16. 04

Patient's Name Maria Cooper

Age 30 Discharged

Disease

Sep:



	DATE.	QUANTITY	COLOUR	SP. G.	RE-ACTION	ALBUMEN	SUGAR	PUS	BLOOD
URINE.									

500—10/03.—Yorks. Herald.

Admitted

Patient's Name Maria Cooper Sep. 16th 1904

Age 36 Discharged

Disease

Sep.

MONTH DAY	23	24			25			26			27			28			29			30
	P.M.	A.M.		P.M.	A.M.		P.M.	A.M.		P.M.	A.M.		P.M.	A.M.		P.M.	A.M.		P.M.	A.M.
	2 6 10	2 6 10		2 6 10	2 6 10		2 6 10	2 6 10		2 6 10	2 6 10		2 6 10	2 6 10		2 6 10	2 6 10		2 6 10	2 6 10
PULSE	90 96 106	100 100 88		80 82 98	96 90 84		88 84 98	96 90 80		80 90	94 90 84		80 96 94	80 82		90 80 84	80 80 84		84 78 80	80 74 72
RESPN.	26 28 24	26 24 26		28 28 22	22 20 24		20 20 18	21 20 24		22 24 22	22 22 22		20 24 24	22 24 20		24 24 24	22 20 20		20 22 20	22 20 28
DAY OF DISEASE		22			23			24			25			26			27			28
BOWELS					1			1			2.			2.			1.			

URINE.	DATE.	QUANTITY	COLOUR	SP. G.	RE-ACTION	ALBUMEN	SUGAR	PUS	BLOOD

200—10/03—Yorks. Herald.

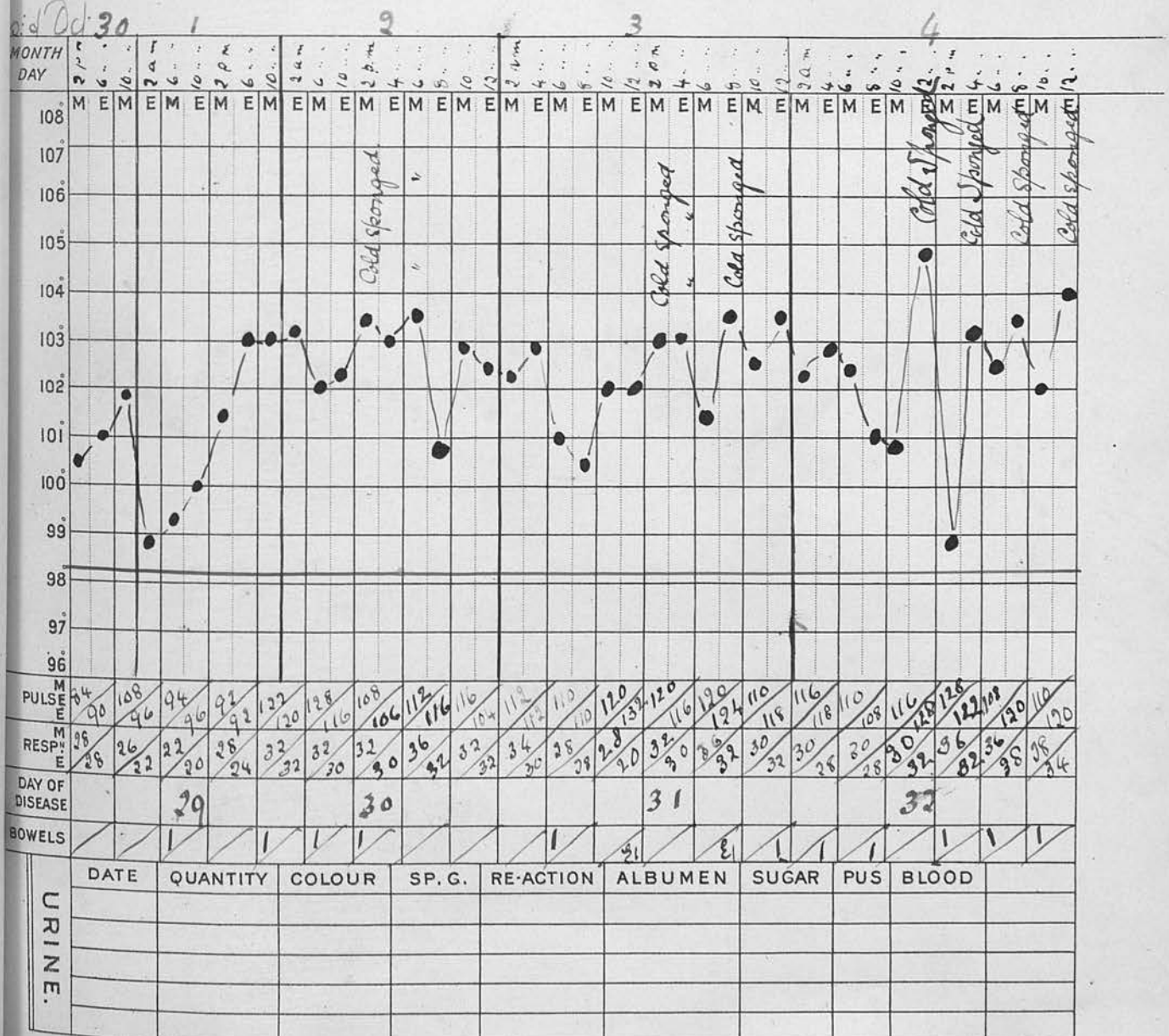
Physician Dr. Turner

Admitted Sept. 16. 04

Patients Name Maria Cooper Age 30 Discharged

Disease

Relapse. Fresh crepts ?
Rhonchi, etc.



URINE.

DATE	QUANTITY	COLOUR	SP. G.	RE-ACTION	ALBUMEN	SUGAR	PUS	BLOOD	

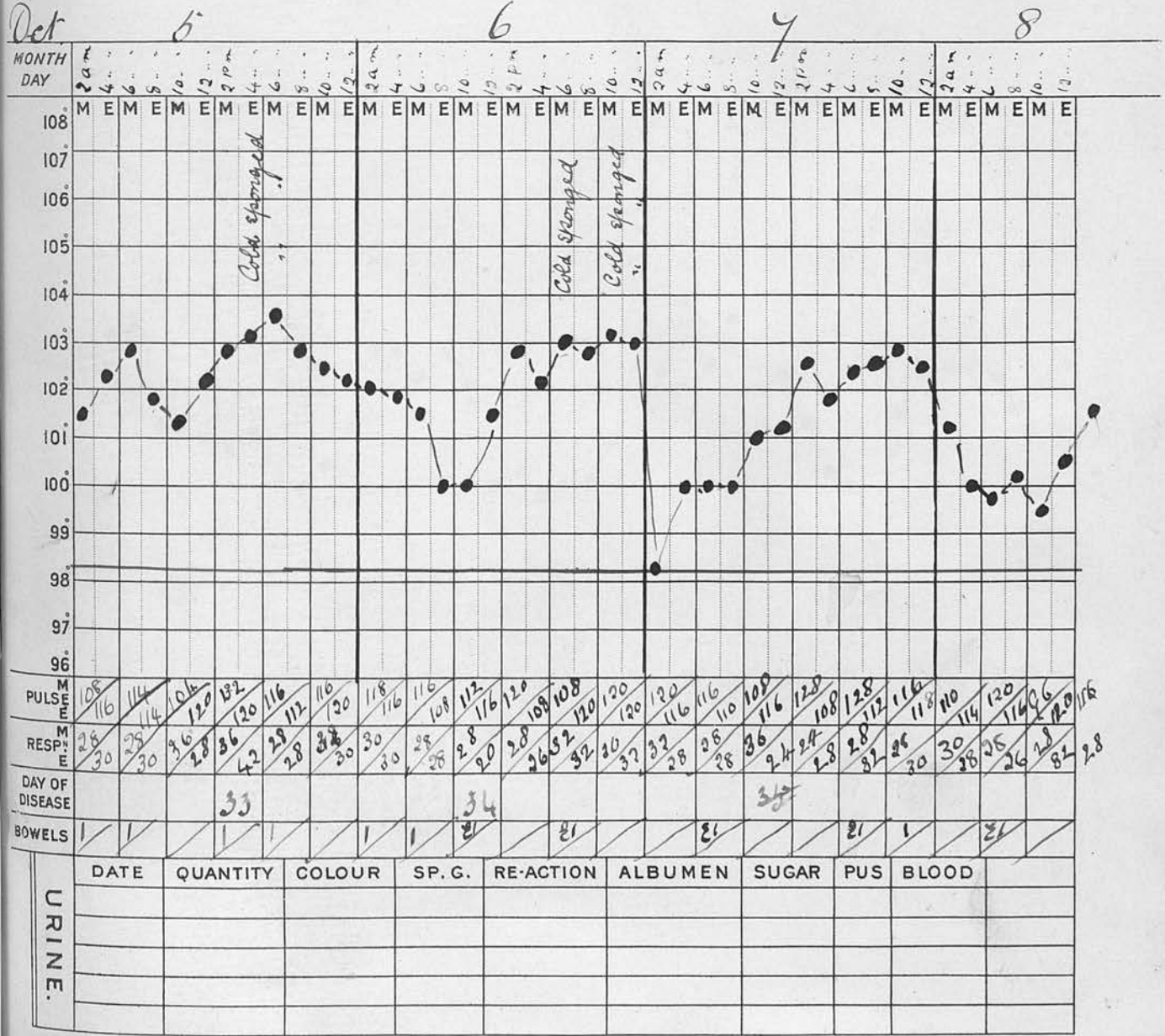
Physician Dr. Turner

Admitted Sep. 16. 04.

Patients Name Maria Cooper Age 30

Disease

Discharged



URINE.

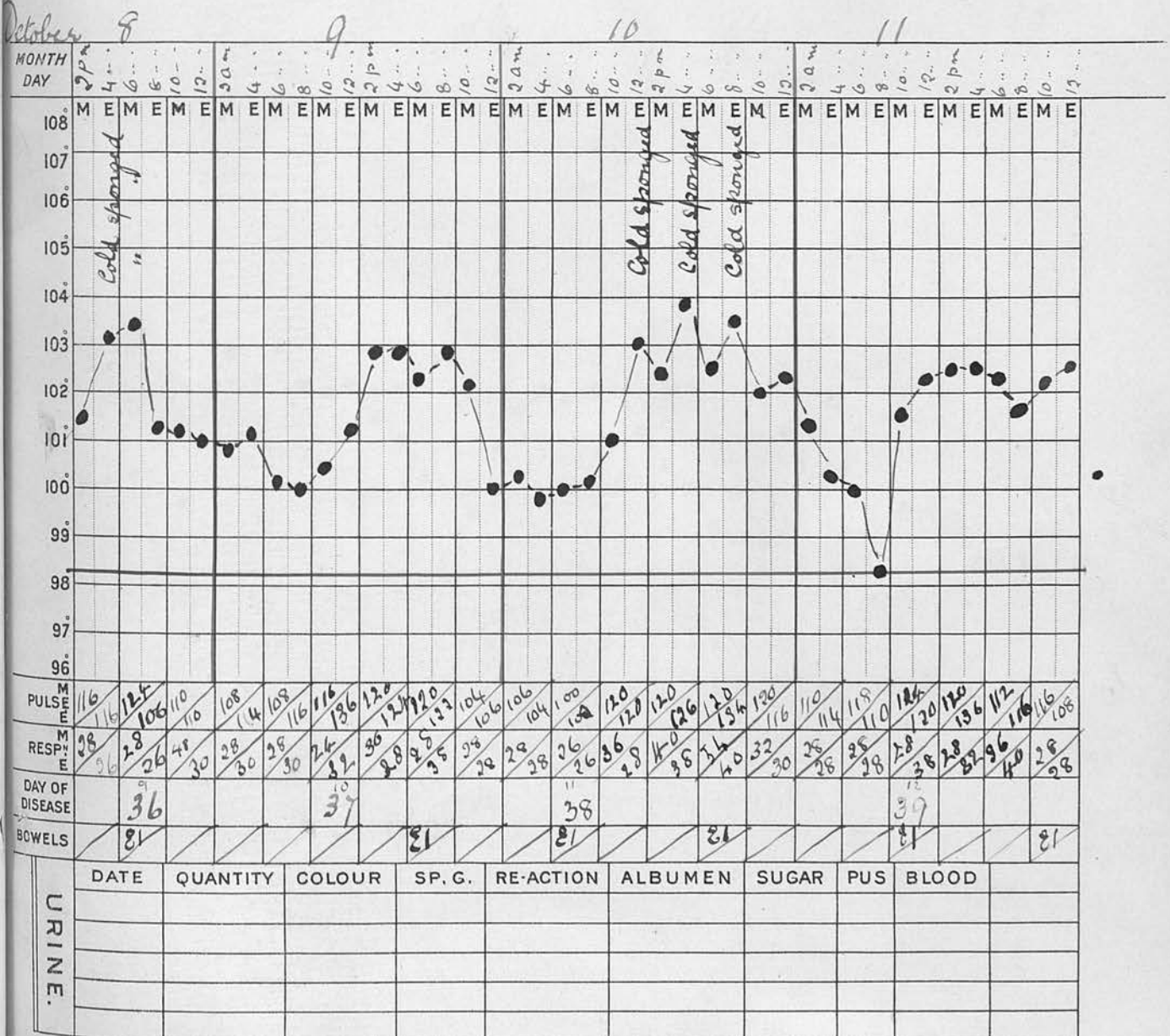
DATE	QUANTITY	COLOUR	SP. G.	RE-ACTION	ALBUMEN	SUGAR	PUS	BLOOD	

Physician Dr. Turner

Admitted Sep: 16. 04

Patients Name Maria Cooper. Age 30 Discharged

Disease



URINE.

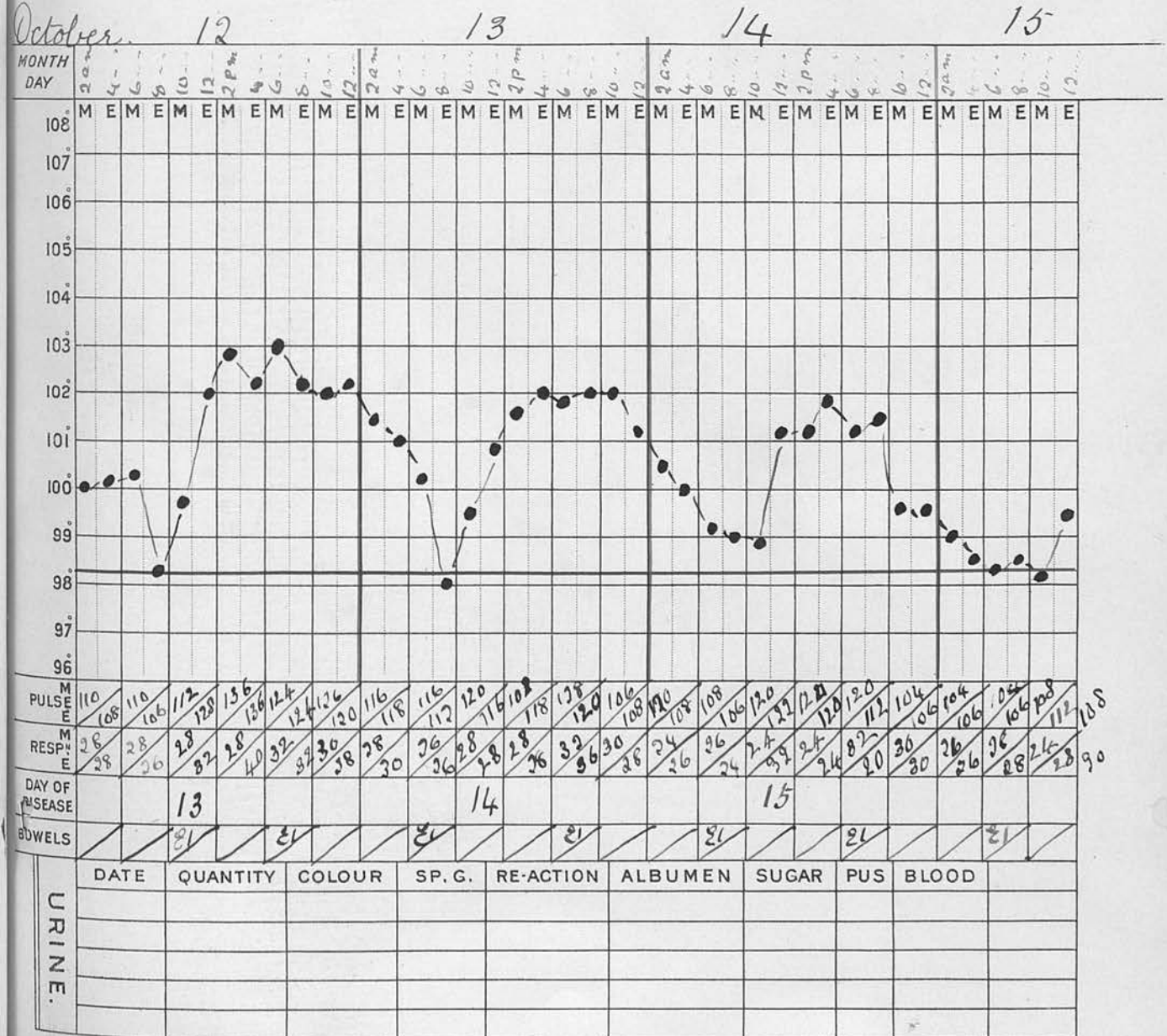
DATE	QUANTITY	COLOUR	SP. G.	RE-ACTION	ALBUMEN	SUGAR	PUS	BLOOD	

Physician Dr Turner

Admitted Sep: 16. 04

Patients Name Maria Cooper Age 30 Discharged

Disease



URINE.

DATE	QUANTITY	COLOUR	SP. G.	RE-ACTION	ALBUMEN	SUGAR	PUS	BLOOD	

Physician Dr. Turner

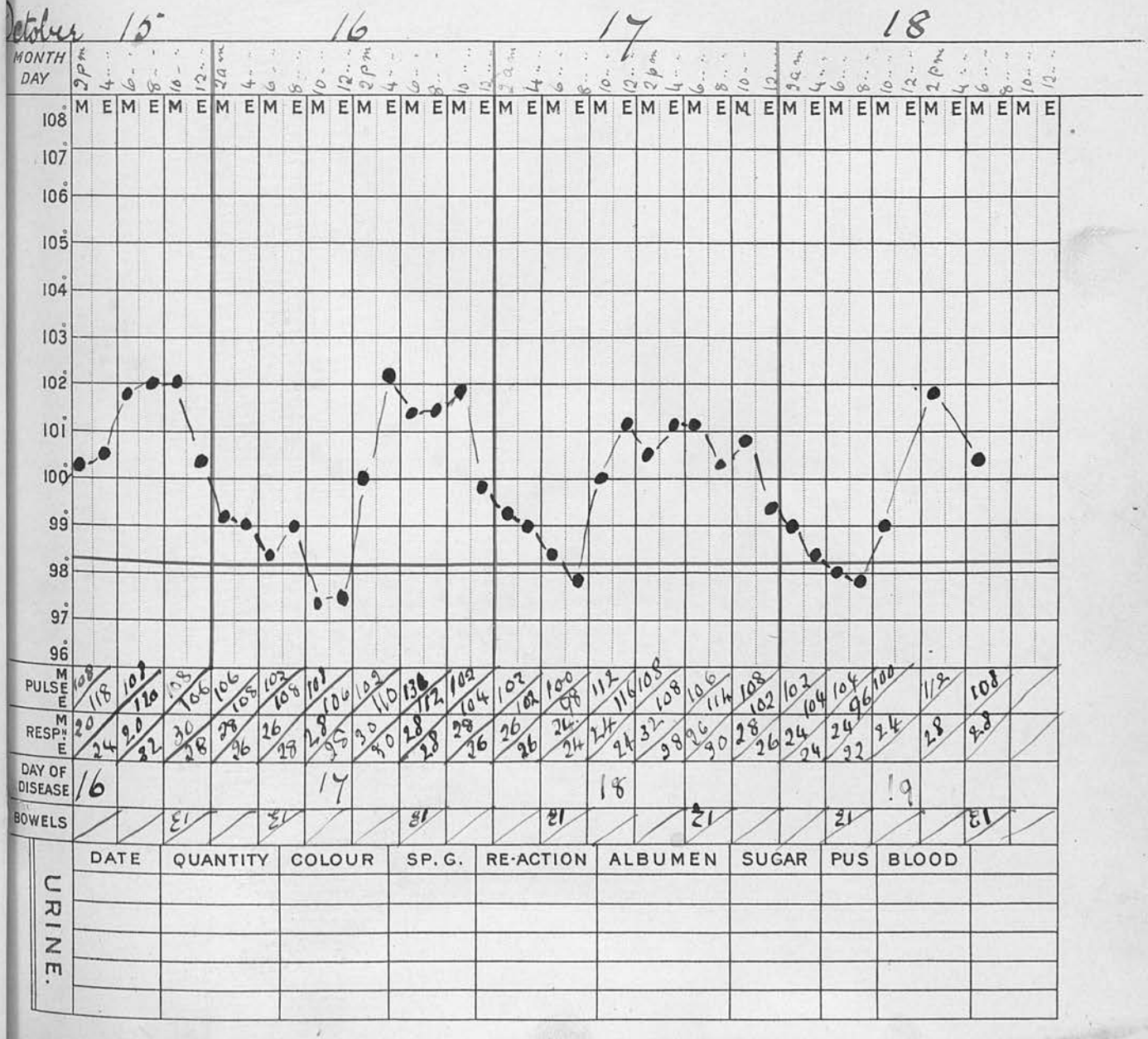
Admitted Sep: 16. 04

Patients Name Maria Cooper

Age 30

Discharged

Disease


October 15 16 17 18
MONTH DAY
M E M E M E

Admitted
Sep: 16. 04

Patient's Name Maria Cooper

Age 30 Discharged

Disease

October

MONTH DAY	18			19						20						21						22						23						24						25		
	P.M.			A.M.			P.M.			A.M.			P.M.			A.M.			P.M.			A.M.			P.M.			A.M.			P.M.			A.M.			P.M.			A.M.		
	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10
PULSE	100	118	108	106	102	108	96	84	92	108	102	84	84	92	104	102	98	80	80	88	92	90	86	72	76	76	92	90	80	72	72	78	74	72	74	68	76	68	98	72	78	72	64
RESPN.	24	28	28	24	22	22	14	20	28	22	20	20	26	26	22	22	20	24	24	24	22	22	20	20	24	24	22	22	20	20	28	26	20	18	20	20	20	20	20	18	20	24	24
DAY OF DISEASE				20						21						1						2						3						4						5		
BOWELS	13			13		13				13					13	13			13			13			13			13			13			13			13			13		

URINE.	DATE.	QUANTITY	COLOUR	SP. G.	RE-ACTION	ALBUMEN	SUGAR	PUS	BLOOD

2000—10/03—Yorks. Herald.

Admitted
Sep: 16. 04

Patient's Name Maria Cooper

Age 30 Discharged

Disease

Oct: Nov.

MONTH		25			26				27				28				29				30				31				1		
DAY																															
		P.M.			A.M.		P.M.		A.M.		P.M.		A.M.		P.M.		A.M.		P.M.		A.M.		P.M.		A.M.		P.M.		A.M.		
		2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10
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PULSE		64	76	70	74	68	76	68	60	74	70	74	64	72	56	76	72	70	64	58	64	74	68	72	68	52	60	70	68	74	64	56	60	74	74	72	64	68	60	74
RESPN.		24	20	20	18	20	24	20	20	24	20	24	20	18	24	22	20	18	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	16	24	24	20
DAY OF DISEASE Convalescent		5			6				7				8				9				10				11				12		
BOWELS		13			13		13		13								13								13						

URINE.

DATE.	QUANTITY	COLOUR	SP. G.	RE-ACTION	ALBUMEN	SUGAR	PUS	BLOOD

3900—10/03—Yorks. Herald.

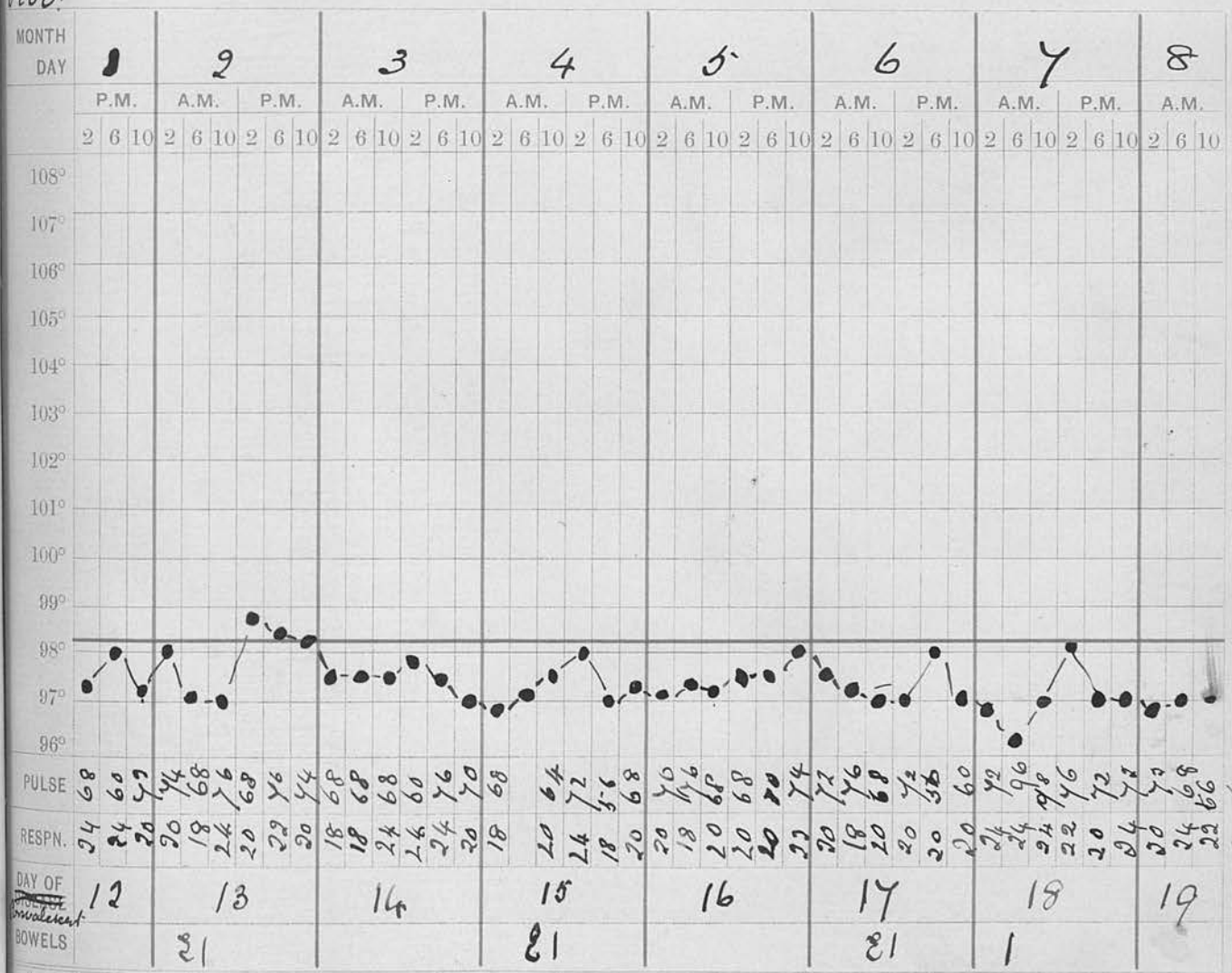
Admitted
Sep: 16.04

Patient's Name Maria Cooper

Age 30 Discharged

Disease

Nov.



URINE.

DATE.	QUANTITY	COLOUR	SP. G.	RE-ACTION	ALBUMEN	SUGAR	PUS	BLOOD

2000—10/03—Yorks. Herald.

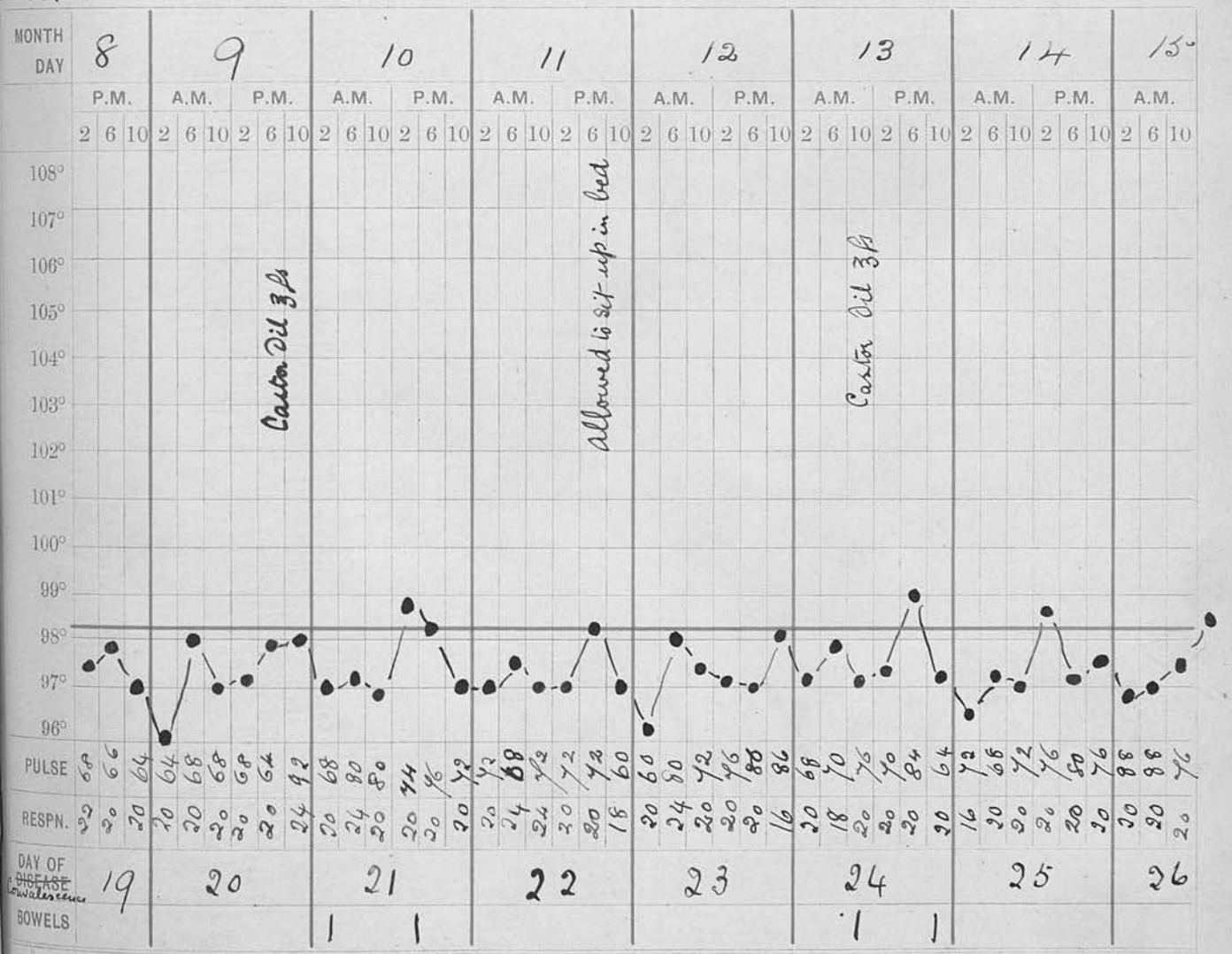
Admitted
Sept. 16. 04

Patient's Name Maria Cooper

Age 30 Discharged

Disease

Nov.



URINE.

DATE.	QUANTITY	COLOUR	SP. G.	RE-ACTION	ALBUMEN	SUGAR	PUS	BLOOD

200—10/03—Yorks. Herald.

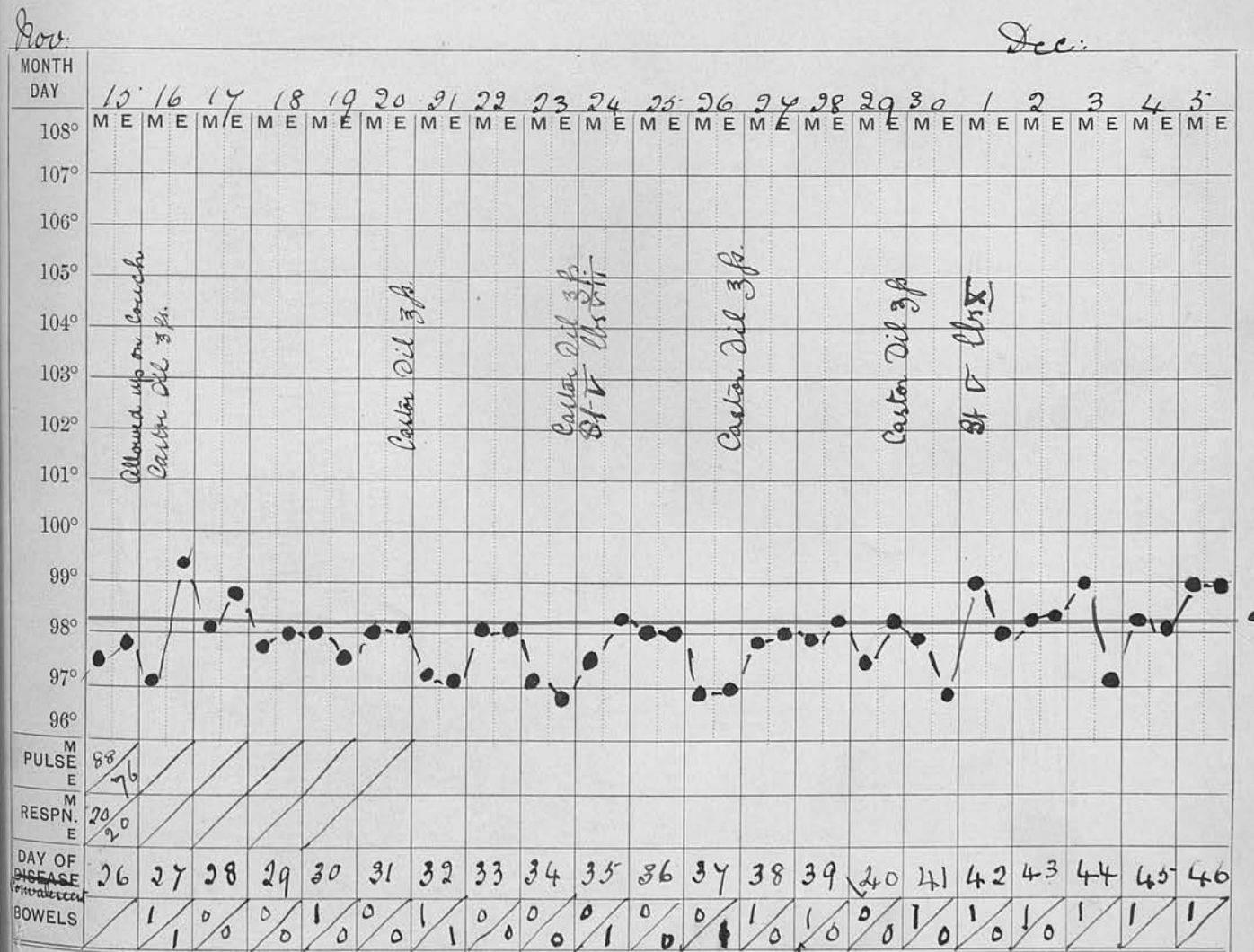
Physician Dr. Turner

Admitted Sep 16. 04

Patient's Name Maria Cooper

Age 30 Discharged

Disease



URINE.	DATE	QUANTITY	COLOUR	SP. G.	RE-ACTION	ALBUMEN	SUGAR	PUS	BLOOD

1000—10/04—Yorks. Herald.

Physician Dr. Turner

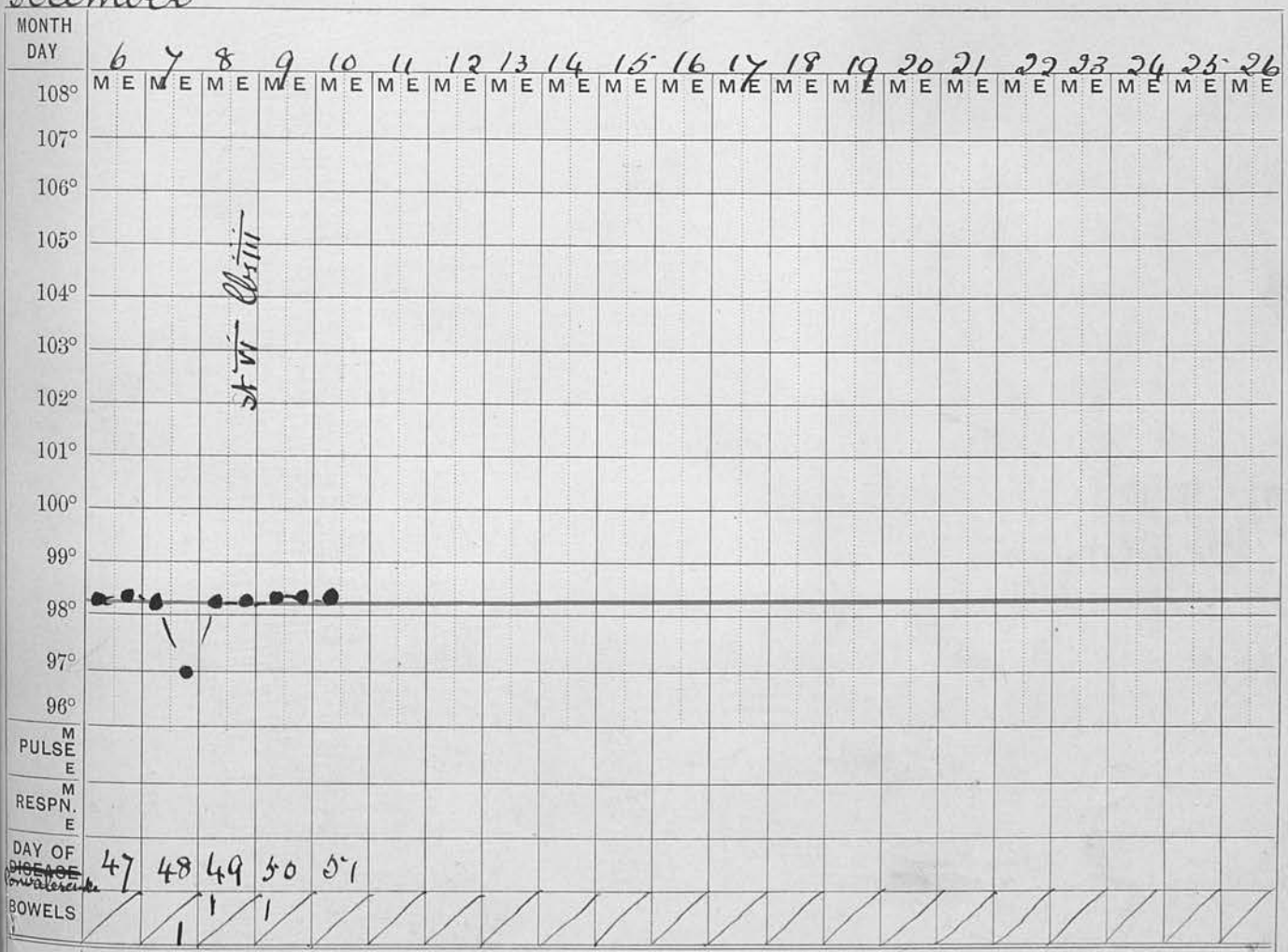
Admitted Sep: 16. 04

Patient's Name Maria Cooper

Age 30 Discharged

Disease

December



URINE.

DATE	QUANTITY	COLOUR	SP. G.	RE-ACTION	ALBUMEN	SUGAR	PUS	BLOOD	

1000—10/04—Yorks. Herald.

971 Copy

n Register.

DR. TURNER.

WARD. 3

e Addison Ernest | Recomd. by The Laurels. Torquay

20 Occupn. Bricklayers apprentice | Date of Admission Sept. 17th 1904

dence 37 Newboro' street | Discharge Nov. 9th 1904

d., Single, or ~~Widod~~.

DISEASE. Enteric Fever

Result C.

DATE.	TREATMENT.
9.04	Rx. Acidozone fl ℥x Syr Aurantii ℥ ij ss Aq ad ℥ j ℥ iv every 2 hours
10.04.	" Every 4 hours.
.10.	" L.d.s 14.10. Stop
0.10	Brist. al Bronchus 3j l.d.s. p.c.
5.10	℥ ij

DATE.	DIET.
17.9.04	Milk ℥ iij p.d.
6.10.04	Benyers or Mellins
9.10.	Bovril. Rusks.
12.10.	Custard
14.10.	Low Boiled Fish
20.10.	Fish Chicken
25.10.	Medium.

Patient's Name Dr. Turner Ernest Harrison

Admitted Sept. 17-00

Age 20 Discharged

Disease

Sept.

MONTH DAY	17	18	19	20	21	22	23	24
	P.M.	A.M. P.M.	A.M. P.M.	A.M. P.M.	A.M. P.M.	A.M. P.M.	A.M. P.M.	A.M.
	2 6 10	2 6 10 2 6 10	2 6 10 2 6 10	2 6 10 2 6 10	2 6 10 2 6 10	2 6 10 2 6 10	2 6 10 2 6 10	2 6 10
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105°								
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102°								
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97°								
96°								
PULSE	76 64 60	54 58 60 58 66 70	62 62 54 64 72 60	62 58 64 76 64 60	58 60 64 60 72 52	50 60 60 92 80 76	56 80 92 88 86 86	88 80 70
RESPN.	32 24 18	20 20 24 20 20 24	20 20 20 30 24 22	20 20 24 28 26 22	22 20 24 28 20 24	20 20 28 26 20 22	22 22 24 28 24 24	24 22 20
DAY OF DISEASE			9 Appx.					
BOWELS		1. 8	1.	1. 1.	2. 1	2. 1. 2	3. 3.	3.

Ov actu.

Cold sponged "

Cold sponged.

Cold sponged "

URINE	DATE.	QUANTITY	COLOUR	SP. G.	RE-ACTION	ALBUMEN	SUGAR	PUS	BLOOD
bat	Sept 18	3xxvi	Normal	1030	Alk.	Clear.			
"	" 19	3	Normal	1025	Acid	Clear.			
"	" 24								

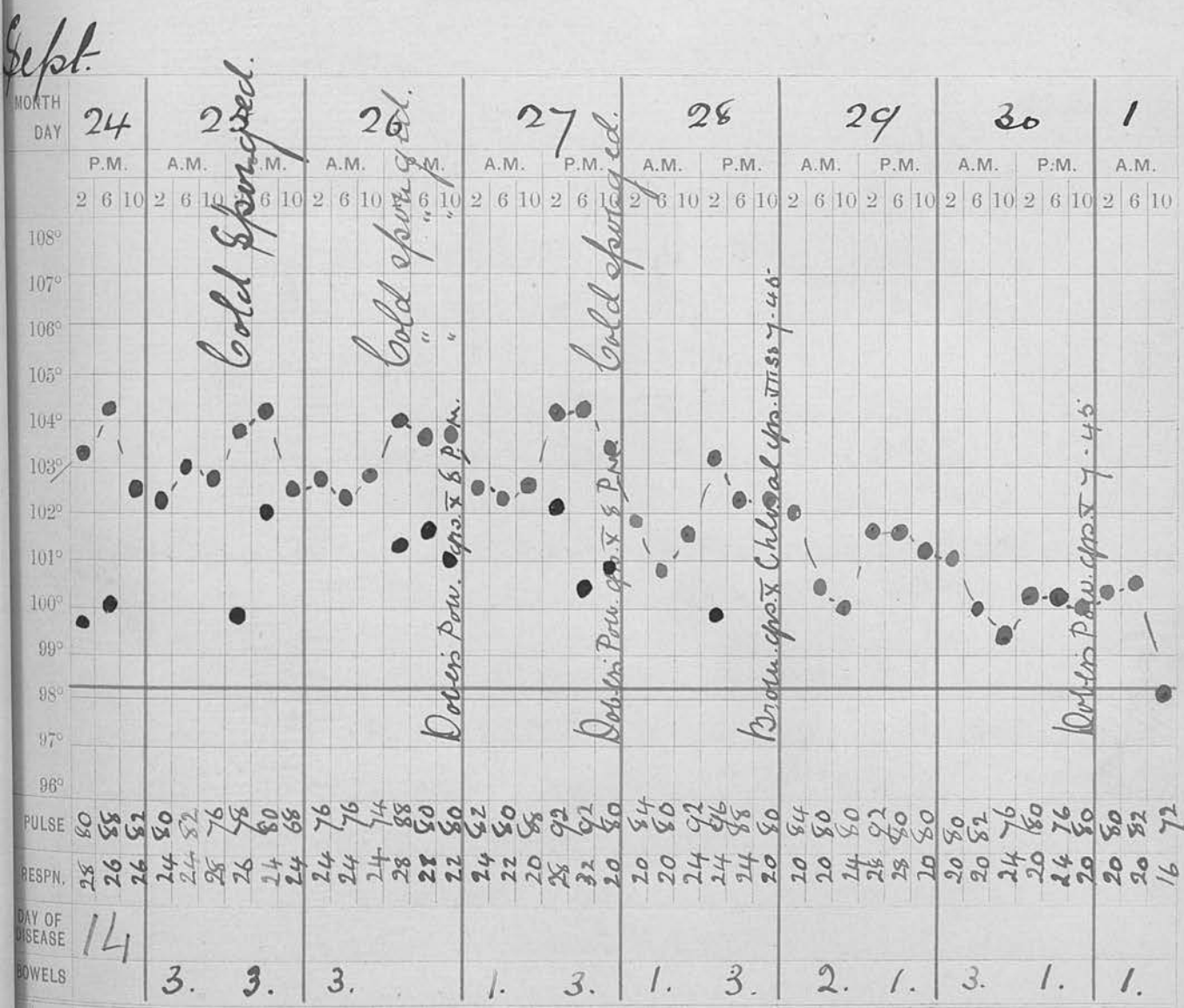
Dr. Turner

Patient's Name Ernest Addison

Admitted Sept. 17-04

Age 20 Discharged

Disease



URINE.

DATE.	QUANTITY	COLOUR	SP. G.	RE-ACTION	ALBUMEN	SUGAR	PUS	BLOOD

200—10/03—Yorks. Herald.

Dr. Turner

Patient's Name Ernest Addison

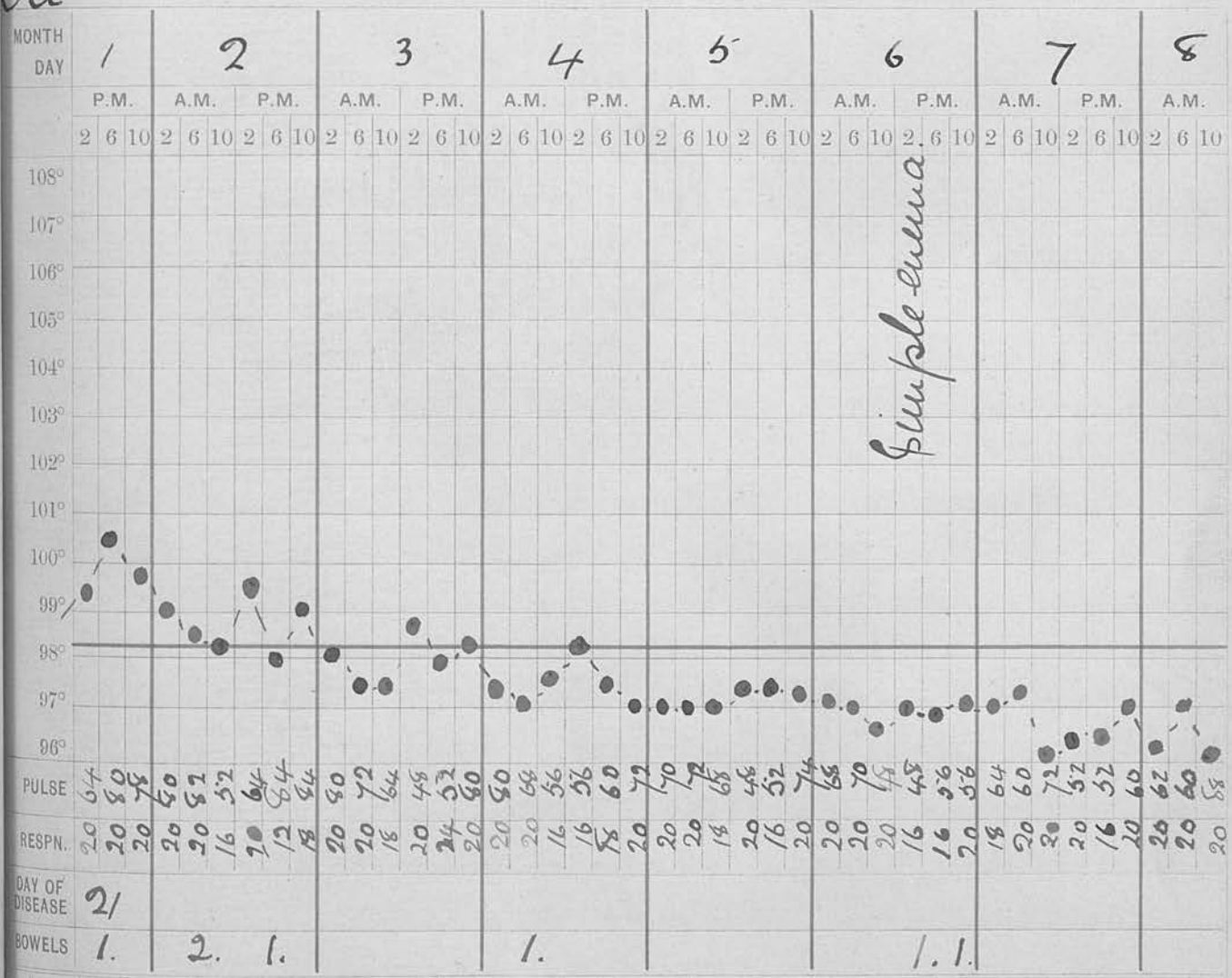
Admitted Sept. 17-04

Age 20

Discharged

Disease

Oct



URINE.

DATE.	QUANTITY	COLOUR	SP. G.	RE-ACTION	ALBUMEN	SUGAR	PUS	BLOOD

560—10/03—Yorks. Herald.

Dr. Turner

Patient's Name Ernest Addison

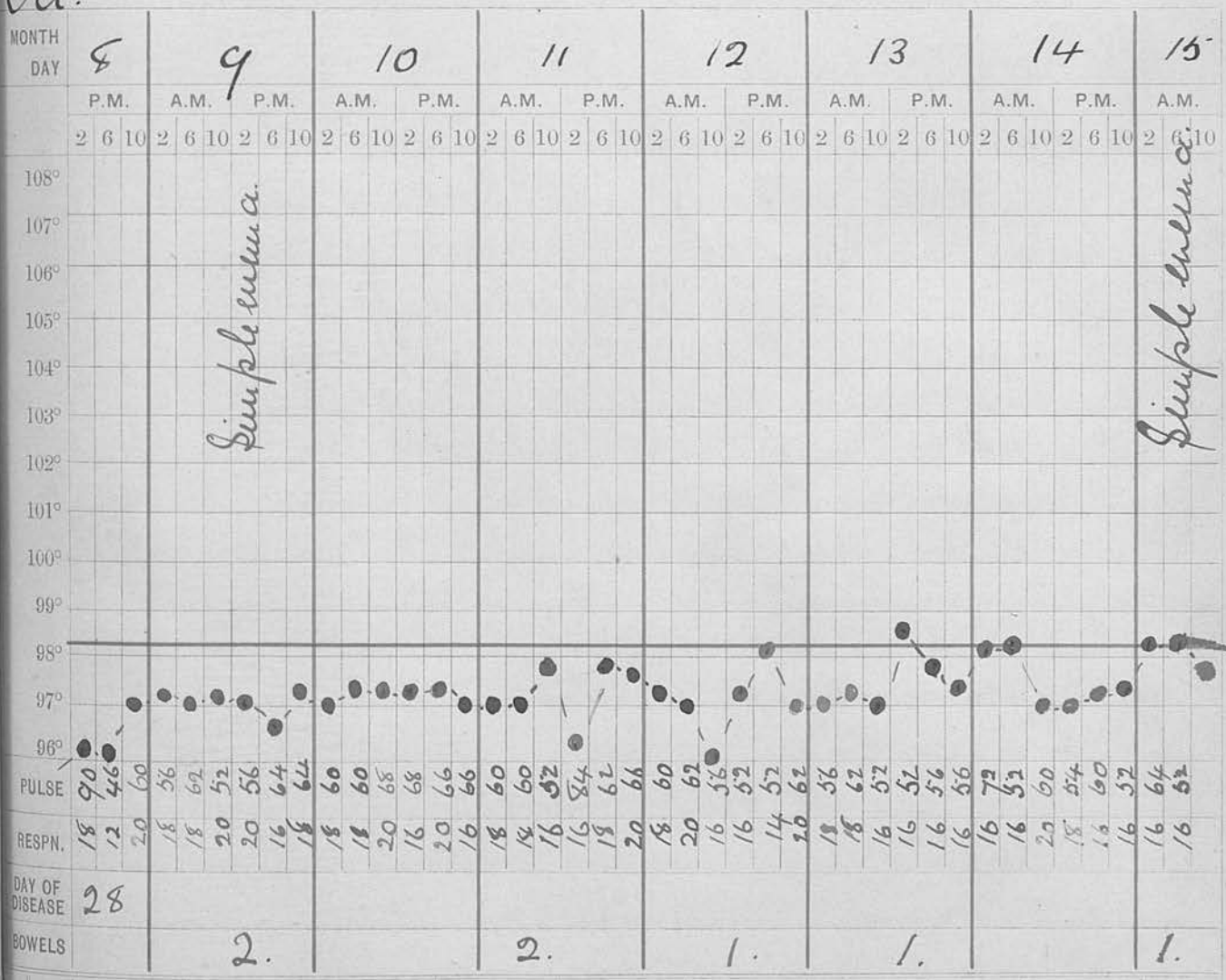
Age 20

Admitted Sept. 17-04

Discharged

Disease

Oct.



URINE.

DATE.	QUANTITY	COLOUR	SP. G.	RE-ACTION	ALBUMEN	SUGAR	PUS	BLOOD

2000—10/03—Yorks. Herald.

Dr. Turner

Patient's Name Ernest Addison

Age 20

Admitted Sept 17. 04

Disease

Discharged

Oct

MONTH		15			16							17							18							19							20							21							22		
DAY																																															
		P.M.			A.M.			P.M.				A.M.			P.M.				A.M.			P.M.				A.M.			P.M.				A.M.			P.M.				A.M.			P.M.				A.M.		
		2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10
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PULSE		64	52	50	62	60	56	64	58	60	60	56	58	64	70	60	70	54	72	60	70	66	60	60	76	80	100	90	92	72	80	84	72	66	70	72	64	68	92	66	60	60	68			
RESPN.		16	16	18	18	18	16	20	16	18	18	18	16	16	18	18	18	18	14	20	16	18	20	20	20	20	20	20	20	20	16	20	16	18	18	18	16	20	16	18	18	18	16			
DAY OF DISEASE		35																																												
BOWELS												1.												1.																1.				1				

Simple Enema

Simple Enema

Ol. Ricini ½ fl.

URINE.

DATE.	QUANTITY	COLOUR	SP. G.	RE-ACTION	ALBUMEN	SUGAR	PUS	BLOOD
Oct 18		Normal	1015	Acid	Clear.			

266—10,03—Yorks. Herald.

Physician Dr. Surber

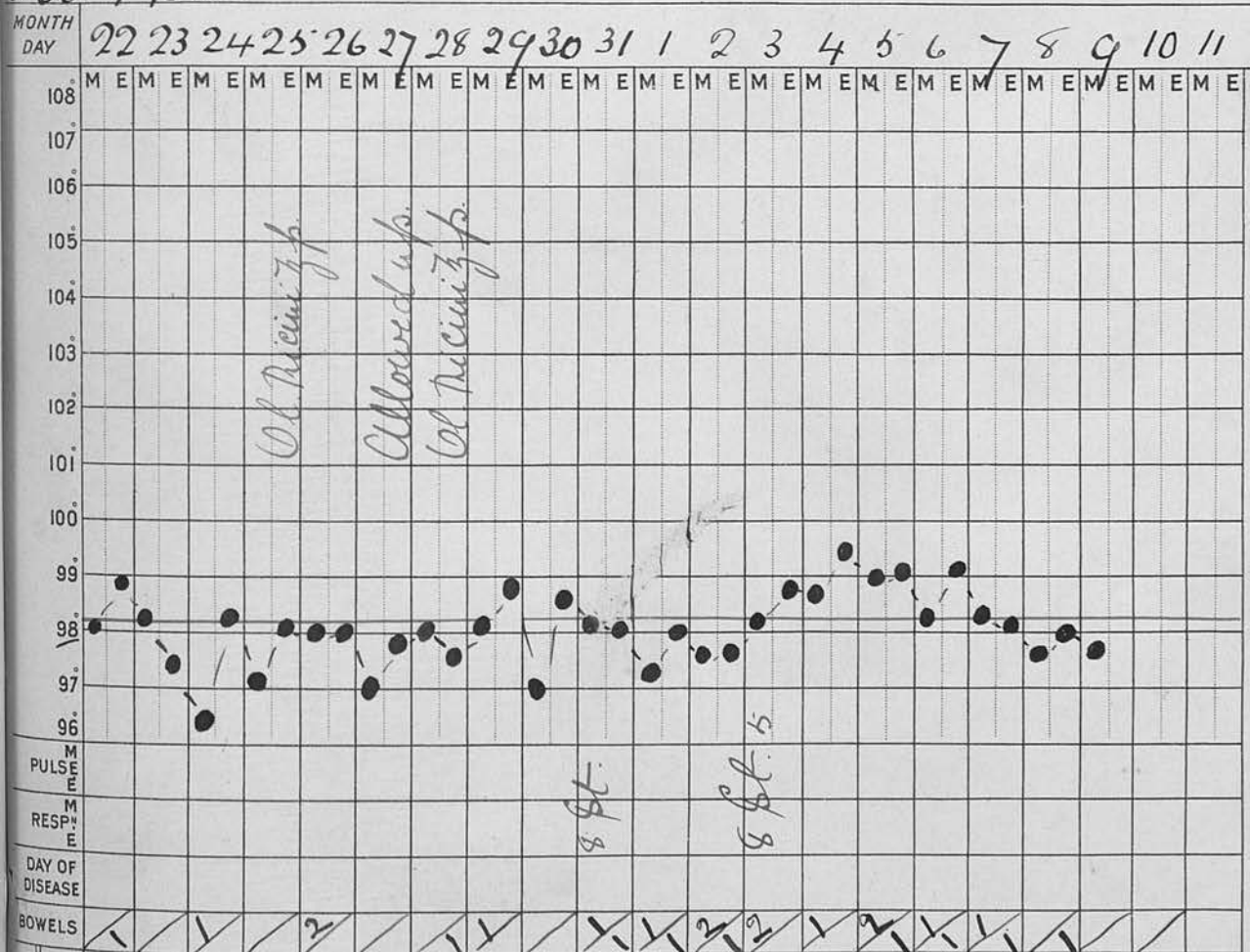
Admitted Sept 17-04

Patients Name Ernest Addison Age 20

Disease

Discharged

Vet. of hob.



URINE.	DATE	QUANTITY	COLOUR	SP. G.	RE-ACTION	ALBUMEN	SUGAR	PUS	BLOOD

304 Copy

Register.

DR. TURNER.

WARD. 6

Jones Annie

14 Occupn.

ence 12 Layerthorpe Buildings

Recomd. by G. Kebden

Date of { Admission October 5th 1904
Discharge December 17th 1904

DISEASE.

, Single, or Widod.

Enteric Fever

Result C.

ATE.	TREATMENT.	DATE.	DIET.
0.04	℞. Acetozone fi X Lys Aurantii ℥ij ss Aq ad ℥j ℥ iv Every 2 hours.	5.10.04.	Milk ℥iv p.d.
		21.10.	Rusks or Shelling Wood. Custard
.10.04.	" 4 hours	25.10.	Cow
.10.04.	" t.d.s	28.10.	Fish. Chicken.
	30.10. Stop	10.11.	Medium.
.10.04	Mist. Camph Co ℥j t.d.s 14.10. Stop		
.10.04.	Mist. Gl. Ironbar ℥j. t.d.s. p.c.		
.11.04	" ℥ij.		
.11.04.	Gl Ferri ℥ss. t.o.s.		

Physician Dr. Turner

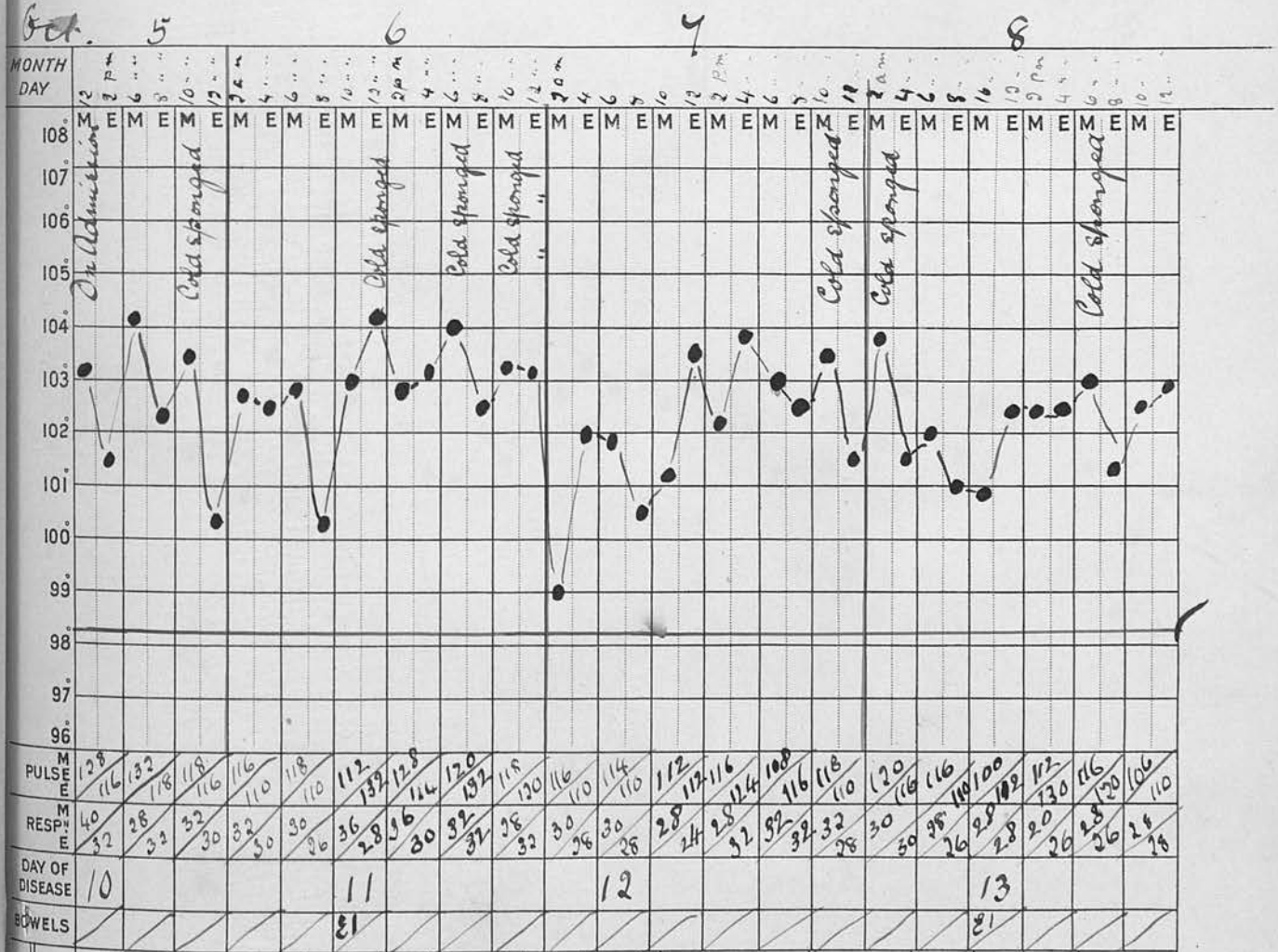
Admitted Oct. 5. 04

Patients Name Annie Jones

Age 14. Discharged

Disease

This pat. very chlorotic & detained in hospital on that account.



URINE.

DATE	QUANTITY	COLOUR	SP. G.	RE-ACTION	ALBUMEN	SUGAR	PUS	BLOOD	
Oct 6		Amber	1012	Acid	No	No		No	

Physician Dr. Turner

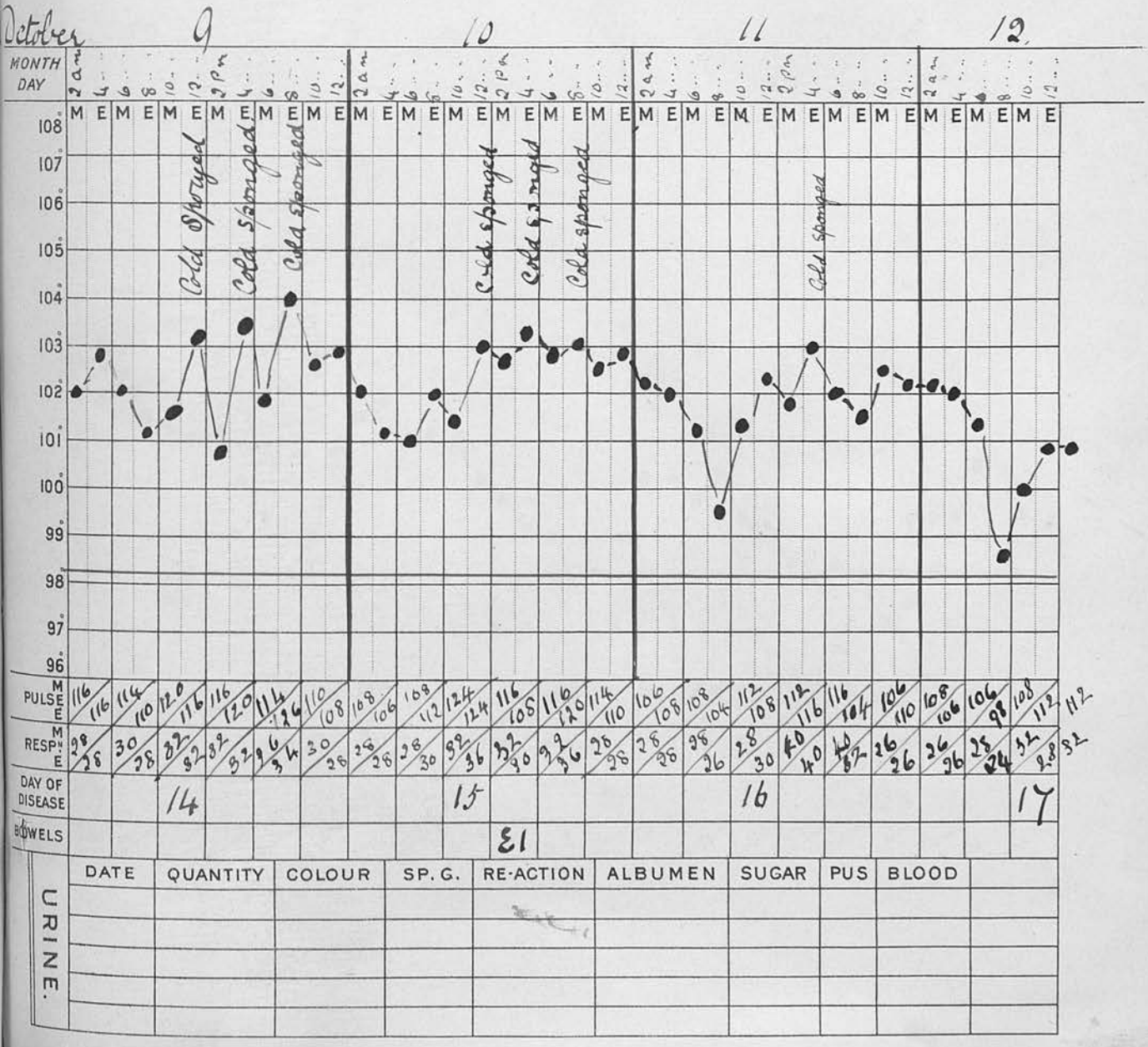
Admitted Oct 5 04.

Patients Name Annie Jones

Age 14

Disease

Discharged



DATE	QUANTITY	COLOUR	SP. G.	RE-ACTION	ALBUMEN	SUGAR	PUS	BLOOD

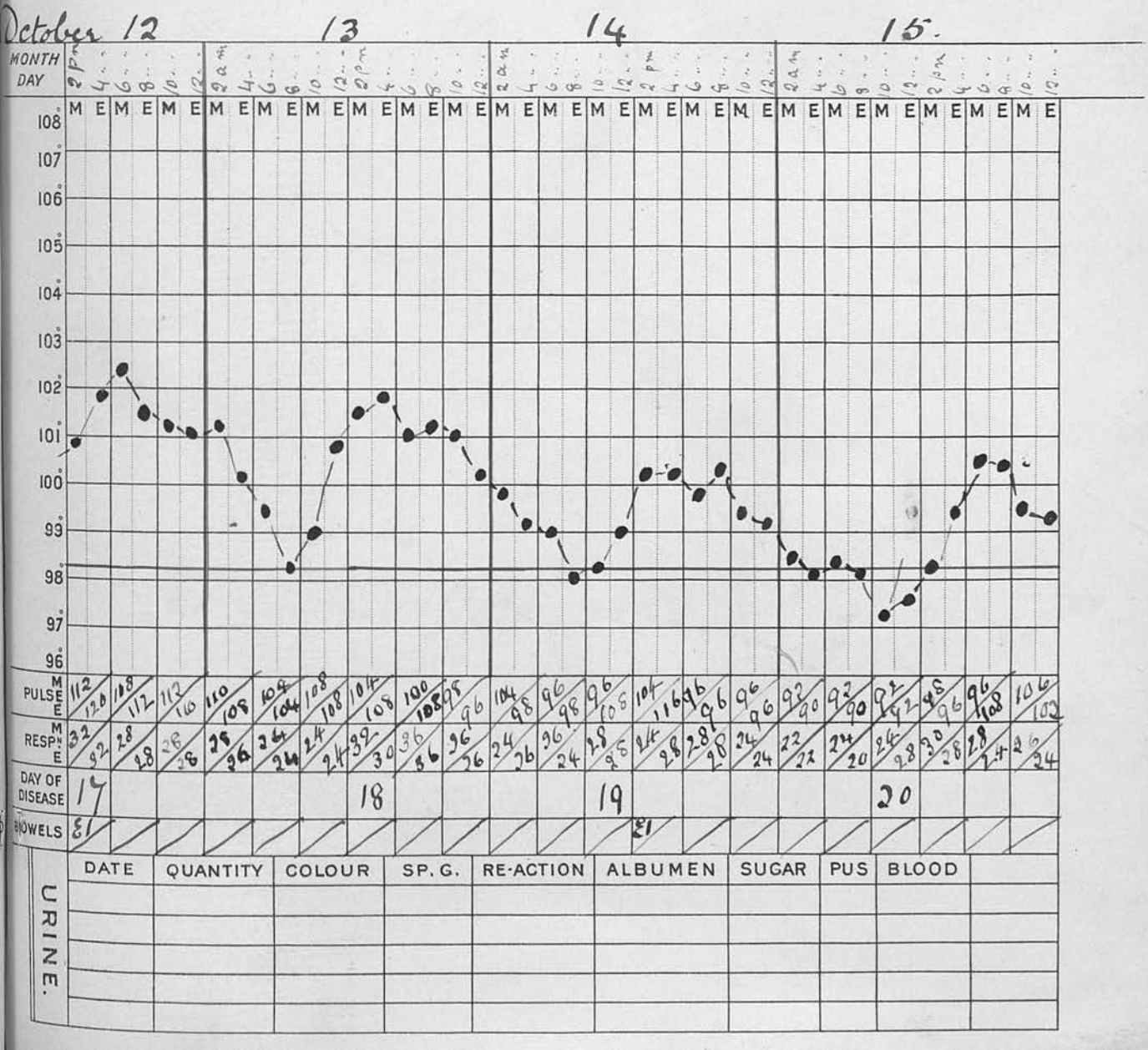
URINE.

Physician Dr. Turner

Admitted Oct. 5. 04.

Patients Name Annie Jones Age 14 Discharged

Disease



URINE.

DATE	QUANTITY	COLOUR	SP. G.	RE-ACTION	ALBUMEN	SUGAR	PUS	BLOOD	

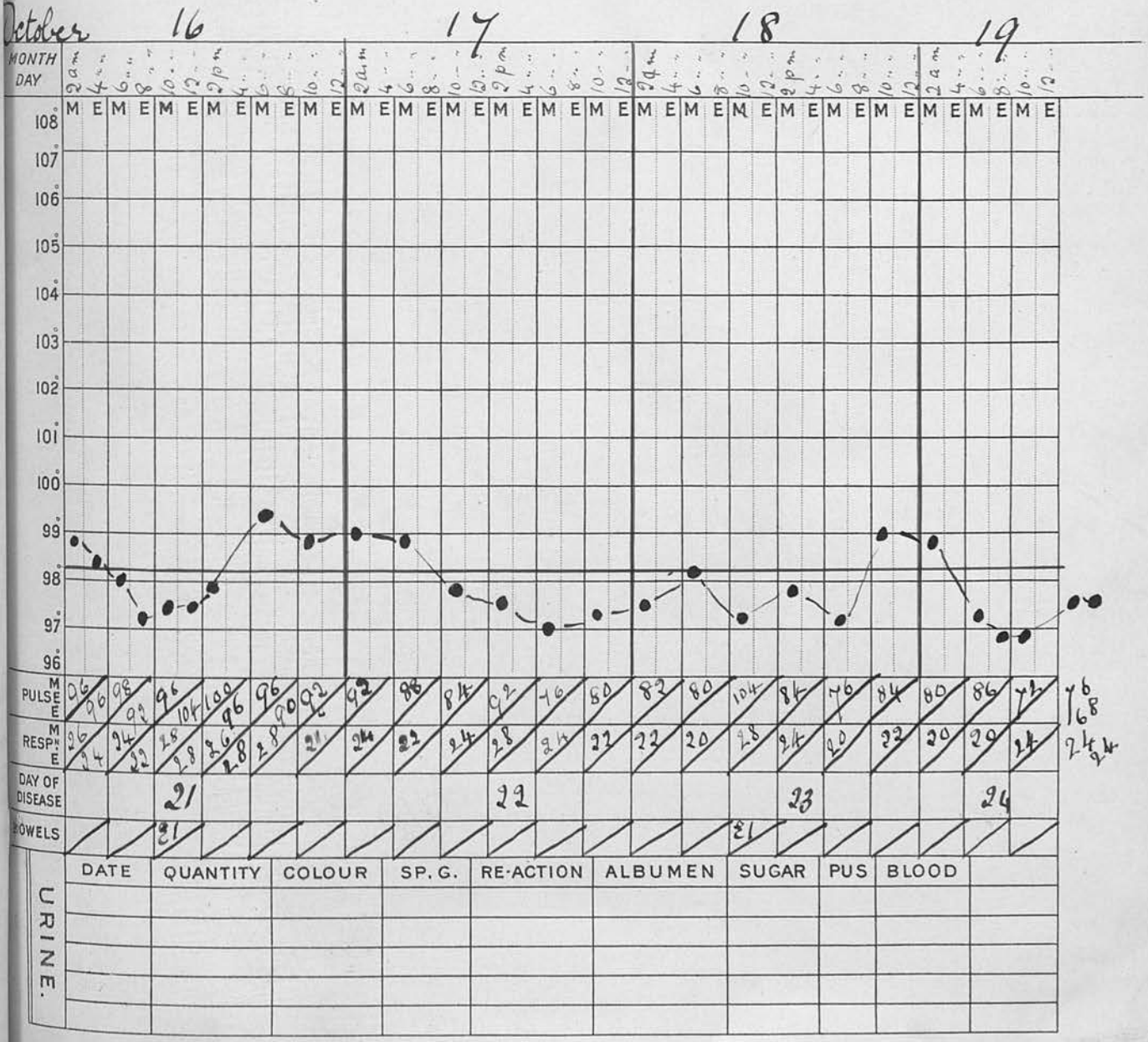
Physician Dr. Turner

Admitted Oct. 5. 04.

Patients Name Annie Jones Age 14

Disease

Discharged



Admitted
Oct: 5. 04.

Patient's Name Annie Jones

Age

Discharged

Disease

October

MONTH DAY	19	20								21								22								23								24								25								26		
	P.M.	A.M.			P.M.					A.M.			P.M.					A.M.			P.M.					A.M.			P.M.					A.M.			P.M.					A.M.			P.M.					A.M.		
	2 6 10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10
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PULSE	76 68 84	86	84	92	76	72	78	76	72	72	76	68	62	68	60	80	80	60	62	68	60	60	60	58	68	70	68	68	92	76	68	70	68	66	60	64	58	64	68	60	64	60							
RESPN.	24 24 30	30	30	24	20	19	20	20	19	20	20	24	18	20	18	20	20	24	18	20	18	14	14	20	16	18	16	24	20	22	18	18	16	20	20	20	16	16	16	24	24							
DAY OF DISEASE		1						2						3						4						5						6																	
BOWELS	convalescence	21												21												21																									

URINE.

DATE.	QUANTITY	COLOUR	SP. G.	RE-ACTION	ALBUMEN	SUGAR	PUS	BLOOD

200—10/03—Yorks. Herald.

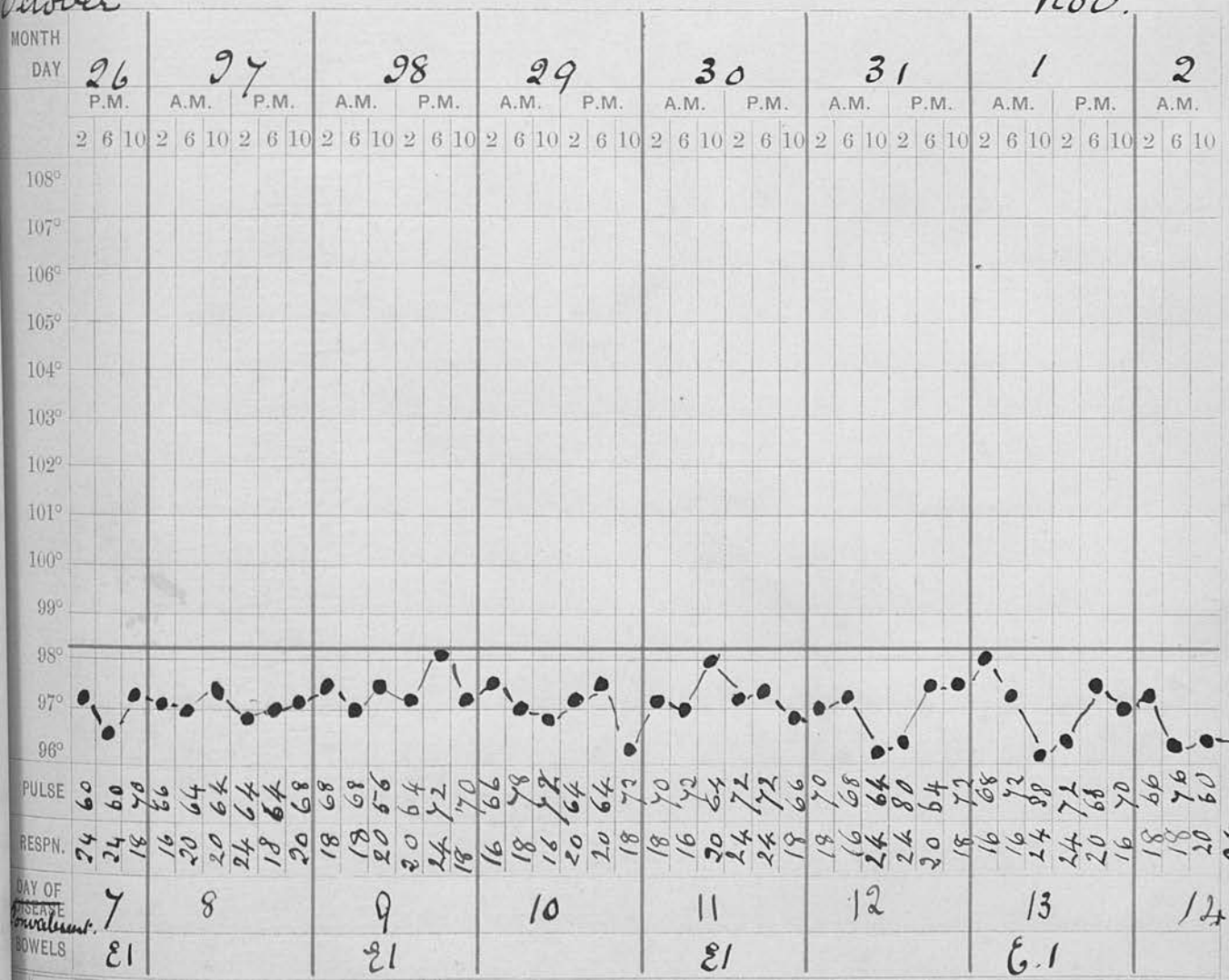
Admitted
Oct: 5. 04.

Patient's Name Annie Jones

Age 14 Discharged

Disease

October Nov.



URINE.	DATE.	QUANTITY	COLOUR	SP. G.	RE-ACTION	ALBUMEN	SUGAR	PUS	BLOOD

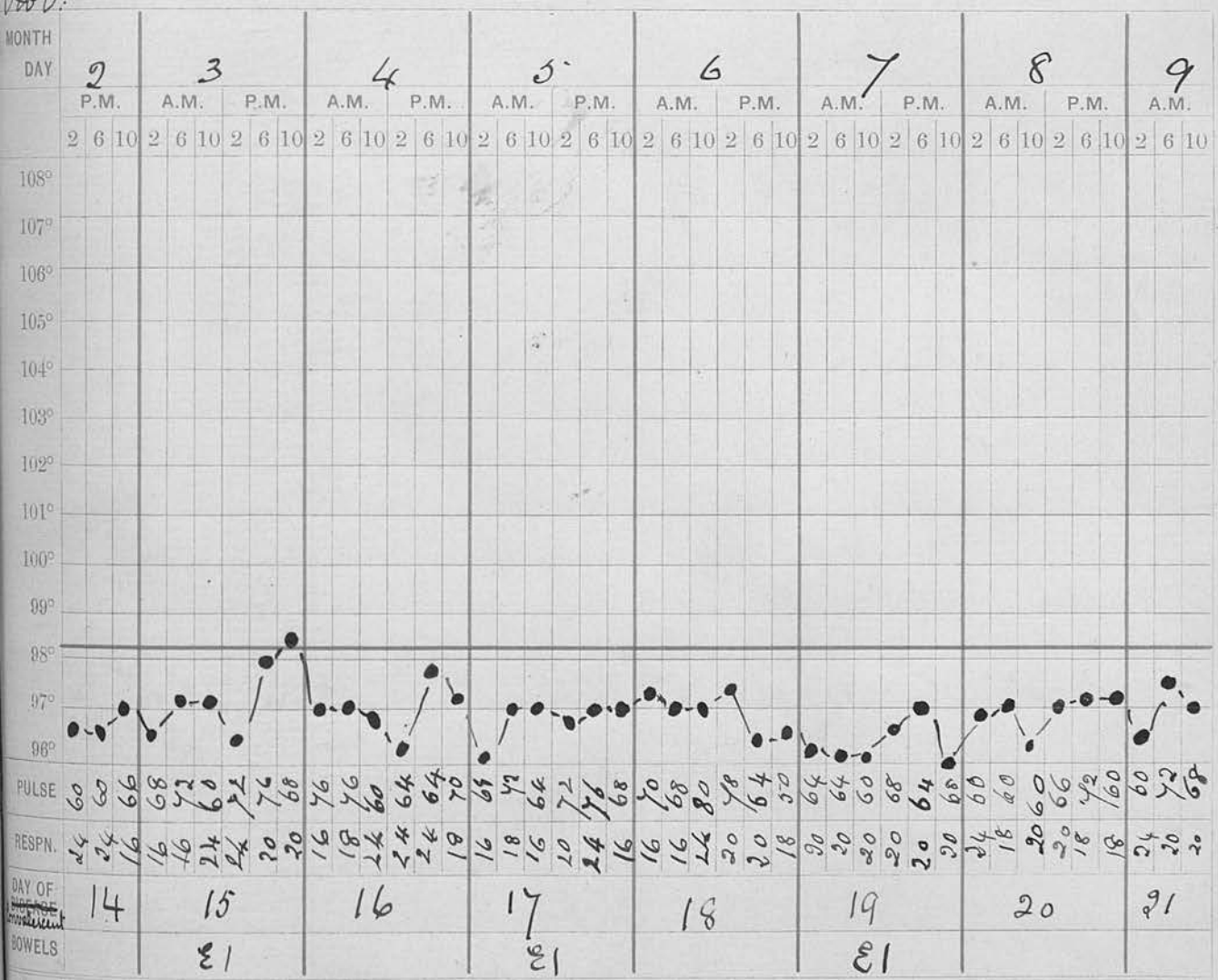
Admitted
Oct. 5. 04

Patient's Name Annie Jones

Age 14 Discharged

Disease

Nov.



URINE.	DATE.	QUANTITY.	COLOUR	SP. G.	RE-ACTION	ALBUMEN	SUGAR	PUS	BLOOD

200—10/08—York's Herald

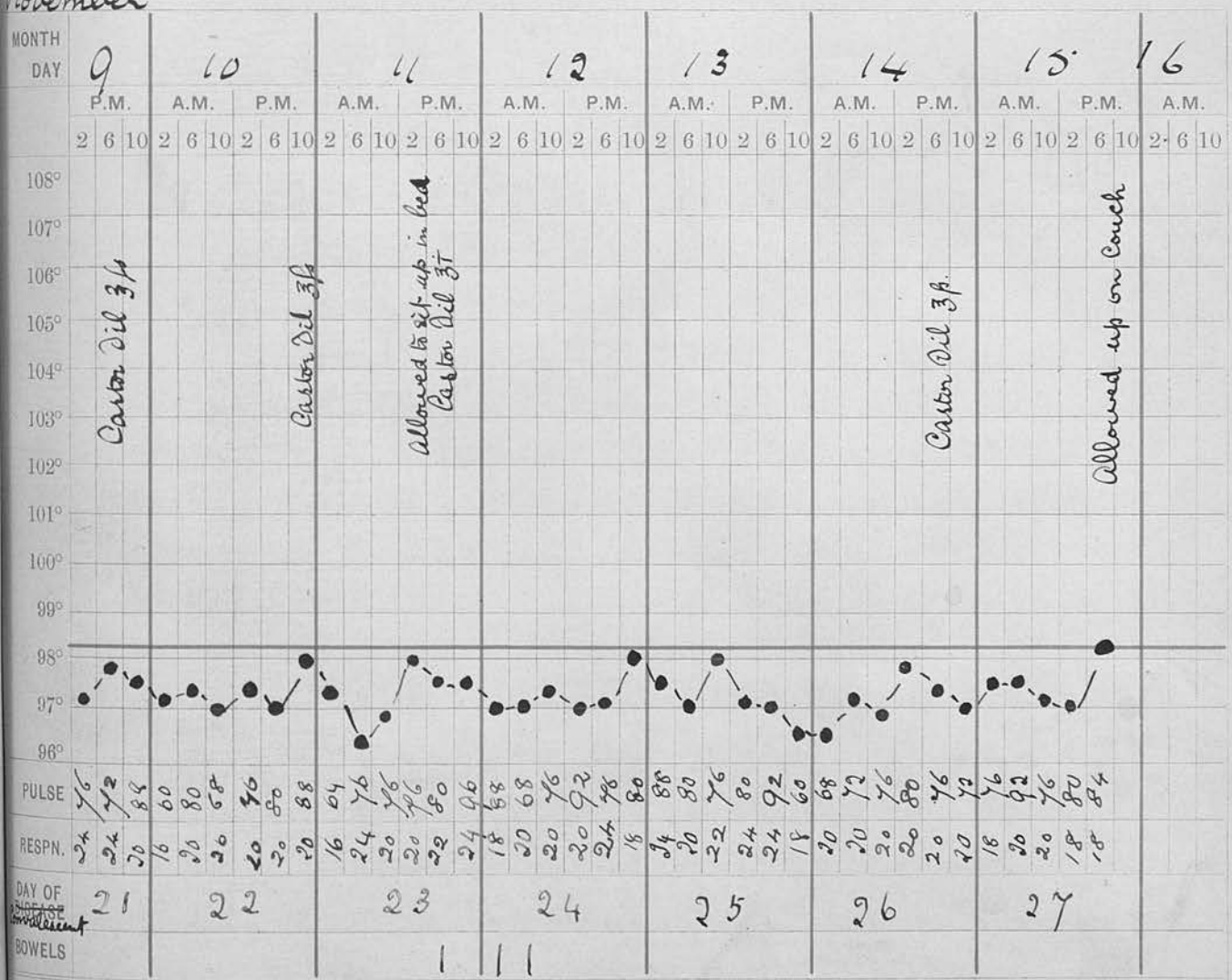
Admitted
Oct. 5. 04

Patient's Name Annie Jones

Age 14 Discharged

Disease

November



URINE.

DATE.	QUANTITY	COLOUR	SP. G.	RE-ACTION	ALBUMEN	SUGAR	PUS	BLOOD

3000—10/03—Yorks. Herald.

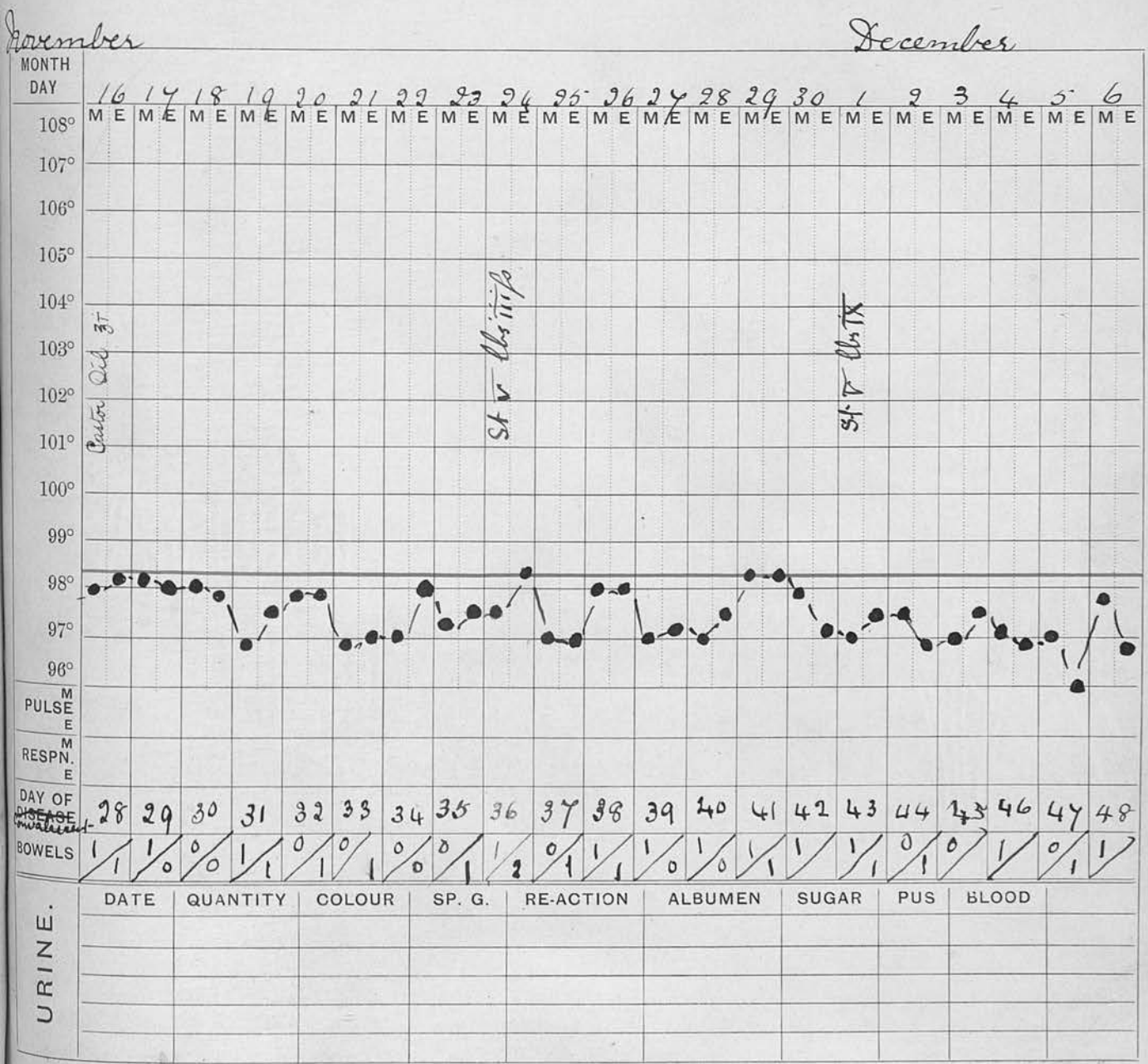
Physician Dr Turner

Admitted Oct: 5: 04

Patient's Name Annie Jones

Age 14 Discharged

Disease



URINE.

DATE	QUANTITY	COLOUR	SP. G.	RE-ACTION	ALBUMEN	SUGAR	PUS	BLOOD	

Physician Dr. Turner

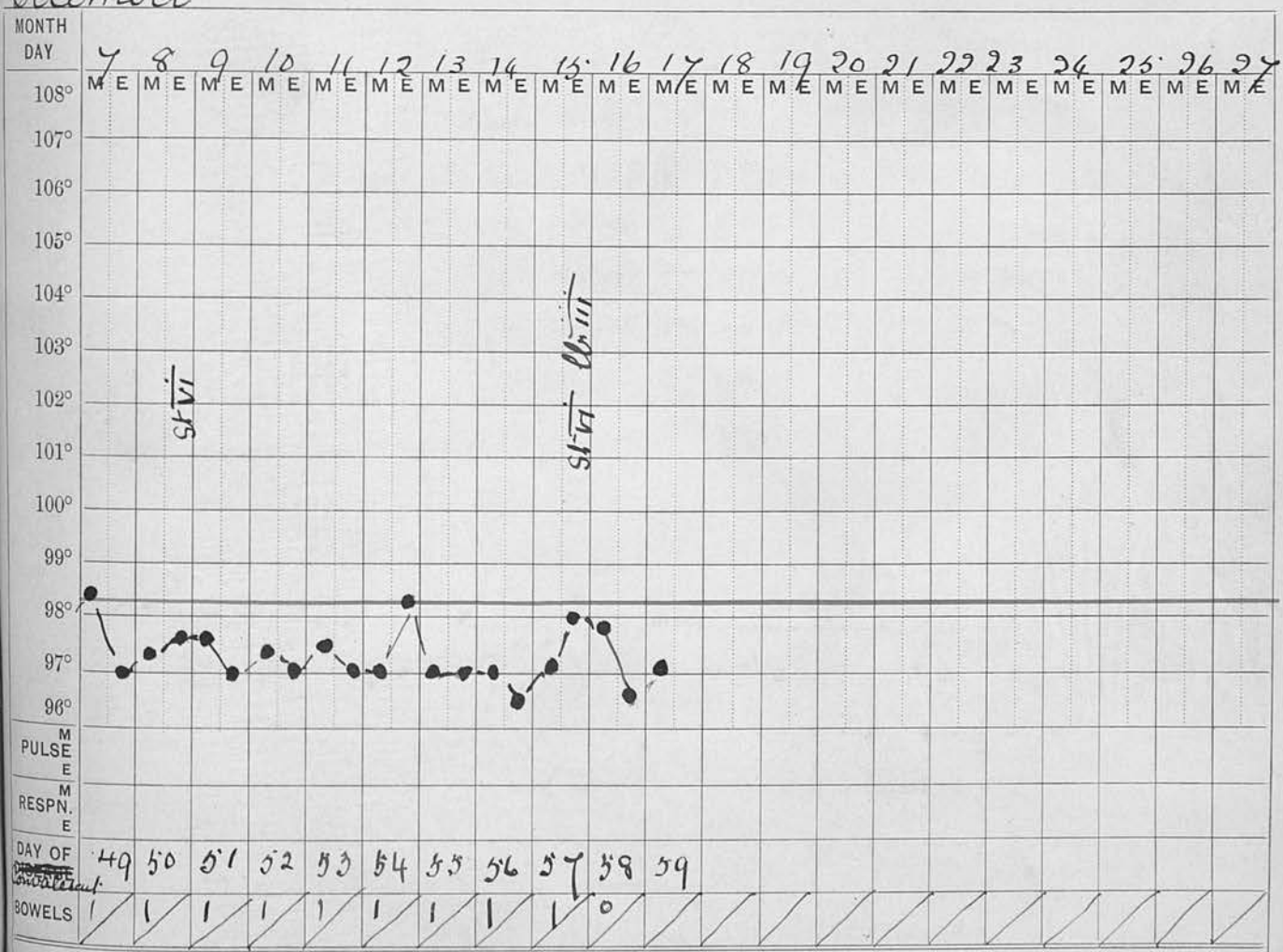
Admitted
Oct. 5. 04.

Patient's Name Annie Jones.

Age 14 Discharged

Disease

December



URINE.

DATE	QUANTITY	COLOUR	SP. G.	RE-ACTION	ALBUMEN	SUGAR	PUS	BLOOD

Physician Dr. Turner

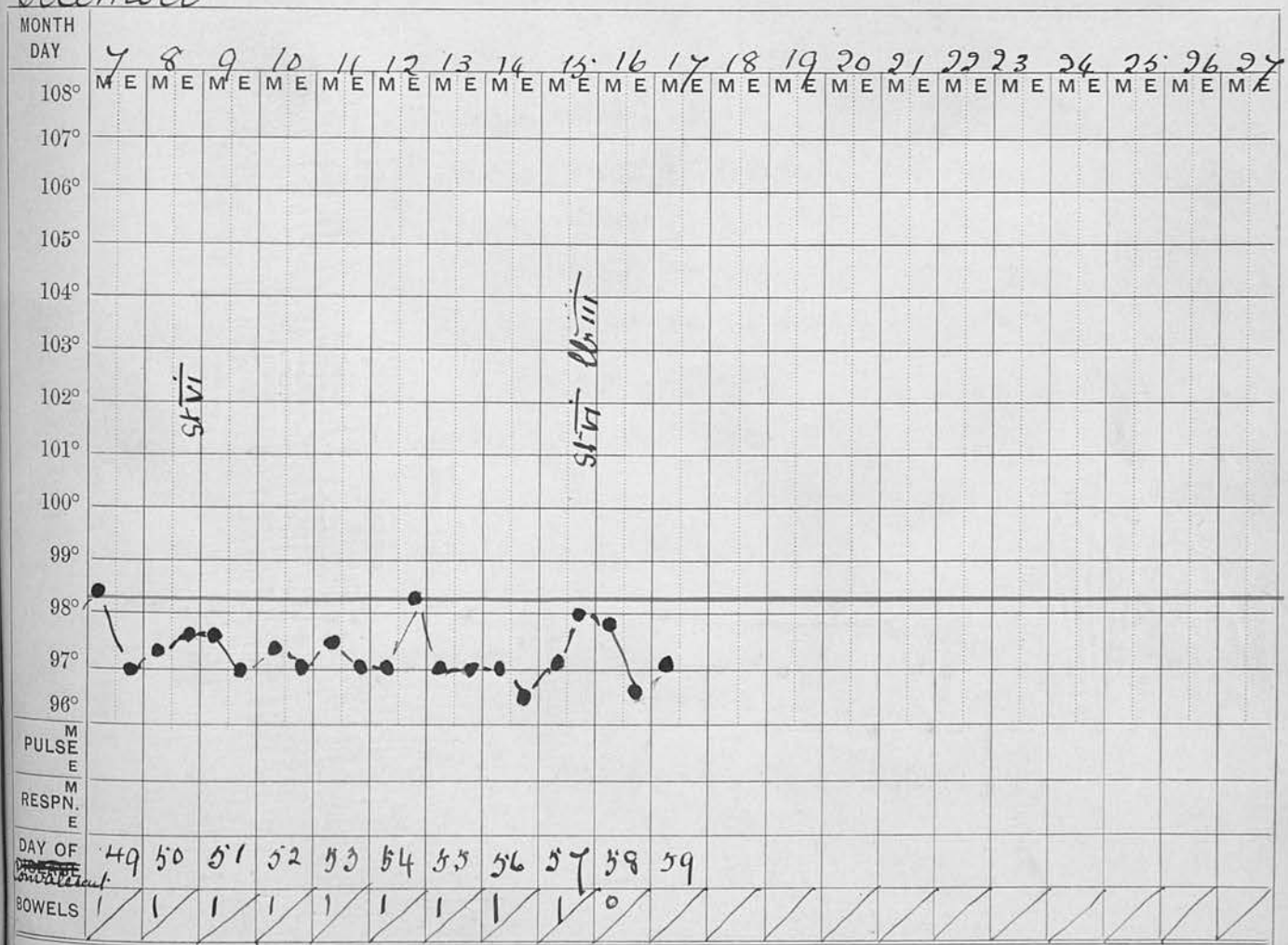
Admitted Oct. 5. 04.

Patient's Name Annie Jones.

Age 14 Discharged

Disease

December



URINE.

DATE	QUANTITY	COLOUR	SP. G.	RE-ACTION	ALBUMEN	SUGAR	PUS	BLOOD

Register.

DR. PETCH.

WARD 6

Sarah Ellen Wilkinson

Recomd. by

23 Occupn. Laundress

Date of { Admission October 21. 04.
Discharge Feb 1, 05.

ence Bradley's Buildings Hungate

DISEASE.

, Single, or Widod. Single.

Enteric Fever.

Result C.

ATE.	TREATMENT.	DATE.	DIET.
1.10.	Sodii Salicyl ℈ X ℥ Succi Rip. ad ℥ 3. 21.10. (now) Every 4 hrs.	21.10.	Peptonised Milk. Oij 24 Brandy ~~℥ij~~ if required
.10	℞ Calomel gr ¼ statim		
0.10.	℞ Calomel gr ¼ statim		
	℞ Effervescing Co gr X statim		
	℞ Acetozone gr X — 0 ℥ Dose ℥ IV — 4 hrs		
	℞ Pil Rep. (to head)		
	℞ ~~Liq Effervescens Salt~~ gr 1/20 4to		
28.	Acetozone 2 tabs.		
	Succ. Comph Co. ℥ 3. ~~4 tabs~~ ~~Lid.s~~	5.0.5.	
	Cold Sponge.		

02

Register.

DR. PETCH.

WARD. 6

Wilkinson Sarah Ellen

23 Occupn. Laundress.

nce Bradleys Buildings Hungate

Recomd. by

Date of Admission Oct. 21st 1904.

Discharge Feb: 1. 05.

Single, or ~~Widod~~.

DISEASE. Enteric

Result C.

TE.	TREATMENT.	DATE.	DIET.
5.10.	Pulv. Ipecac. Co ʒiv Statim.		Ice.
		19.10	Mist. Glycerinae ℥ij t.d.s. pc
9.10.	Ol. hyoscyam. m v Liq. Strych. m j Spt. Ammon. Aromat ʒss. Aq. camph. ad ʒss.	28.10.04	Beef Tea or Chicken tea
		2.12.04	Custard (Egg)
	Every 3 hours. TDS. 24.11.	11.12.04	Bread + milk Pudding.
		17.12.	Bread + butter. Fish or Chicken. Boiled.
31.05.	Ext. Malt. ℥j		
	Ext. Cascarae Liq. m xv t.d.s. p.c.	30.12	Returned
	Adrenalin Chloride gtt x	8/11	~~Peptonised milk 0/4~~ ~~Grellers food 0/4~~
3.10.	2 hrly.		
4.10.	4 hourly.		
	12.10. t.d.s.		
	TDS 4 hourly.	13.11.	
15.11.	19.11.04.		Nutrient Enemata.
	Hypod. Morphia ~~Bgtt~~ gr ¼ c Atropiae gtt 100.		Peptonised Milk Bovinine. aa ℥ij
	S.O.S.		3 hrly.
	16.11.		Nutrient 6 hrly.
17.11.	R Soup		Rep. draught. ℥ij t.d.s.

Physician Dr. Petch

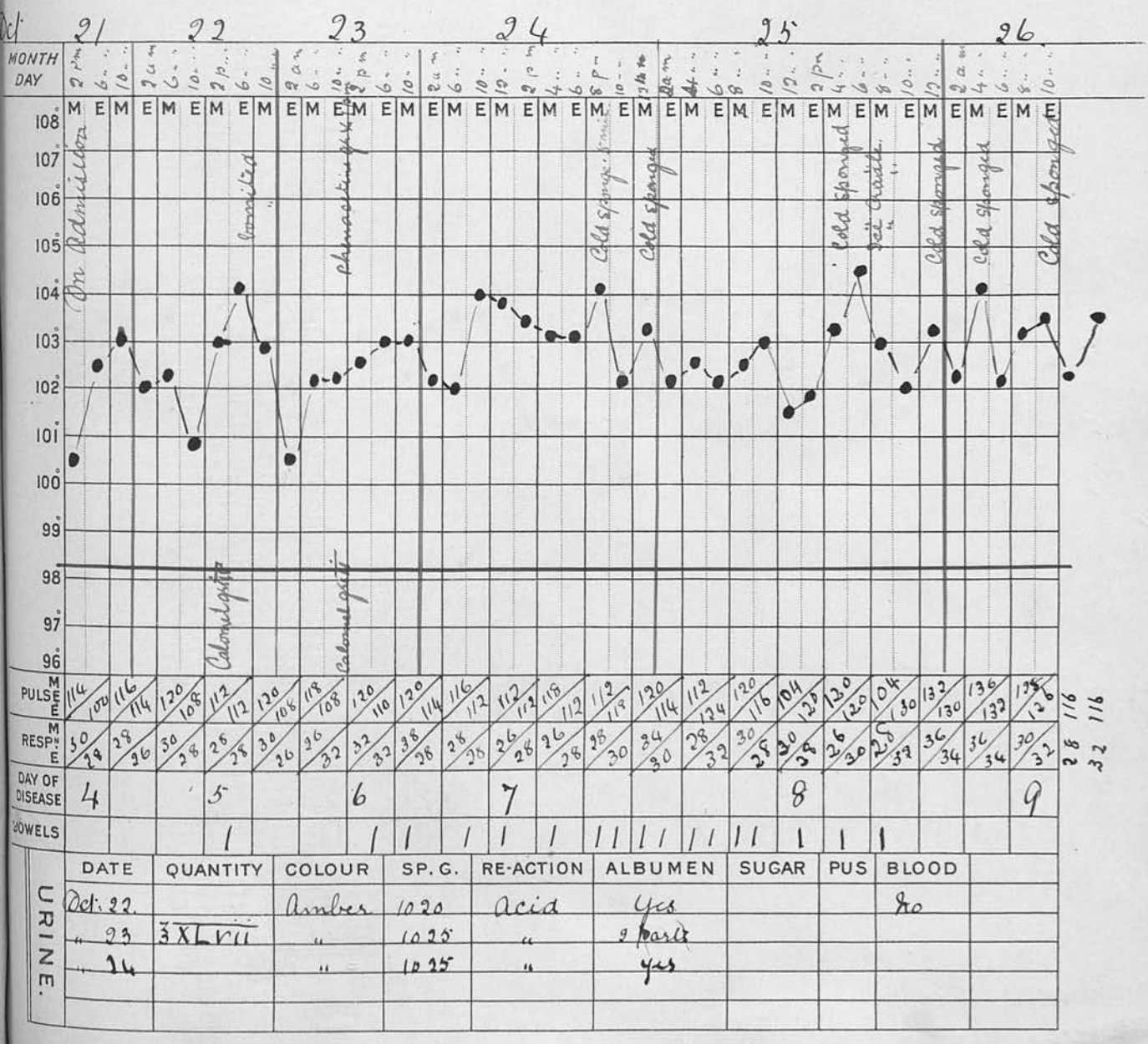
Admitted Oct: 21. 04

Patients Name Sarah Wilkinson Age 23. Discharged

Disease

Had been at work till day of admission when she walked up to O.P. department complaining of all symptoms of Rheumatic fever acute was treated as such for 2 days. Very delirious & sleepless, "cradled" on 4th day after admission. Deafness began on 7th day after admission & persisted till end of fever, not absolute.

Cradled & Ice bag to Abdomen



DATE	QUANTITY	COLOUR	SP. G.	RE-ACTION	ALBUMEN	SUGAR	PUS	BLOOD
Oct: 22.		Amber	1020	Acid	Yes			No
" 23	℥XLVII	"	1025	"	2 parts			
" 24		"	1025	"	Yes			

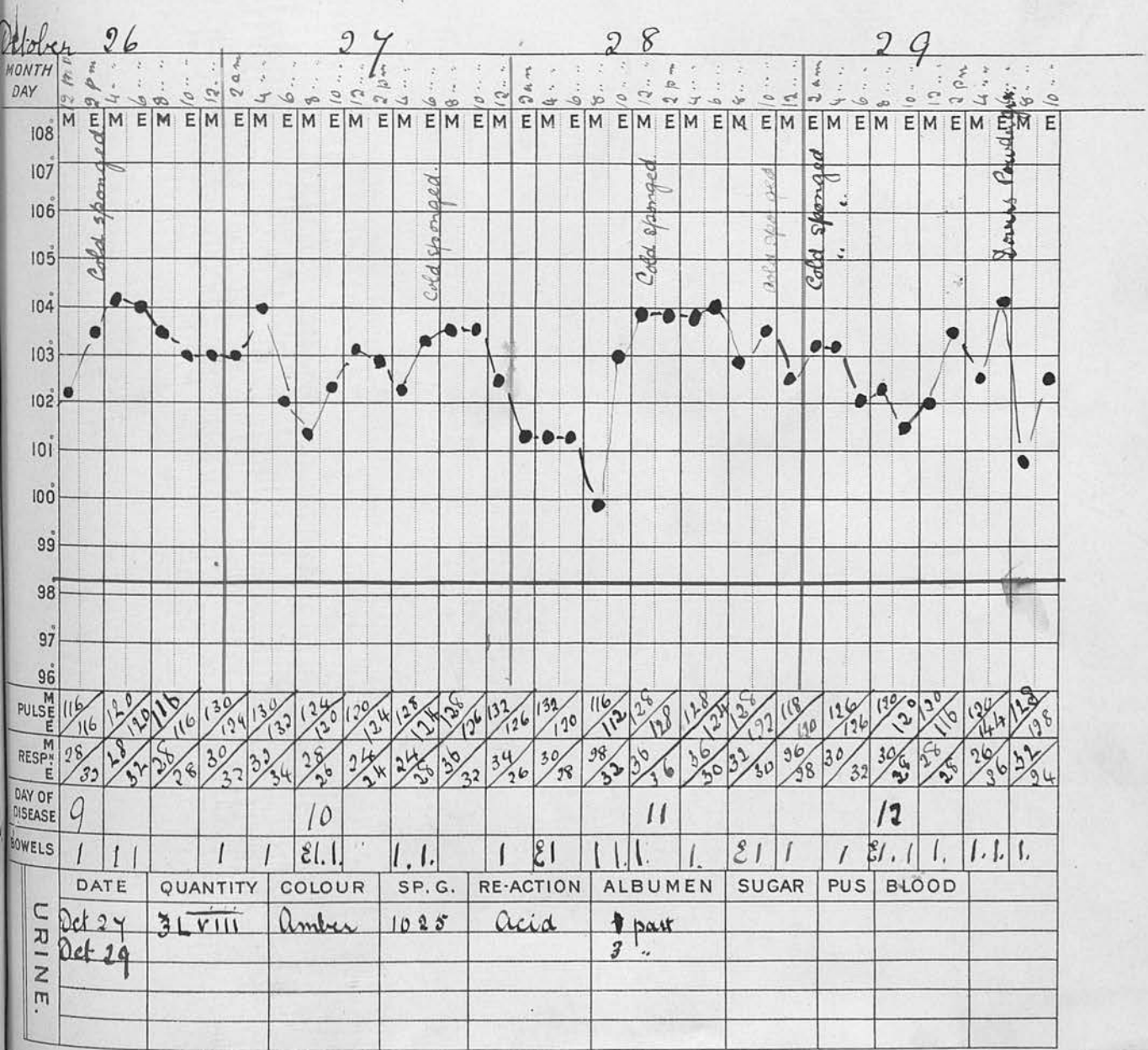
URINE.

Physician Dr. Pelch

Admitted Oct: 21. 04.

Patients Name Sarah Wilkinson Age 23. Discharged

Disease



URINE.	DATE	QUANTITY	COLOUR	SP. G.	RE-ACTION	ALBUMEN	SUGAR	PUS	BLOOD	
	Oct 24	3 L viii	Amber	1025	Acid	† part				
	Oct 29					3 "				

Physician Dr. Petch

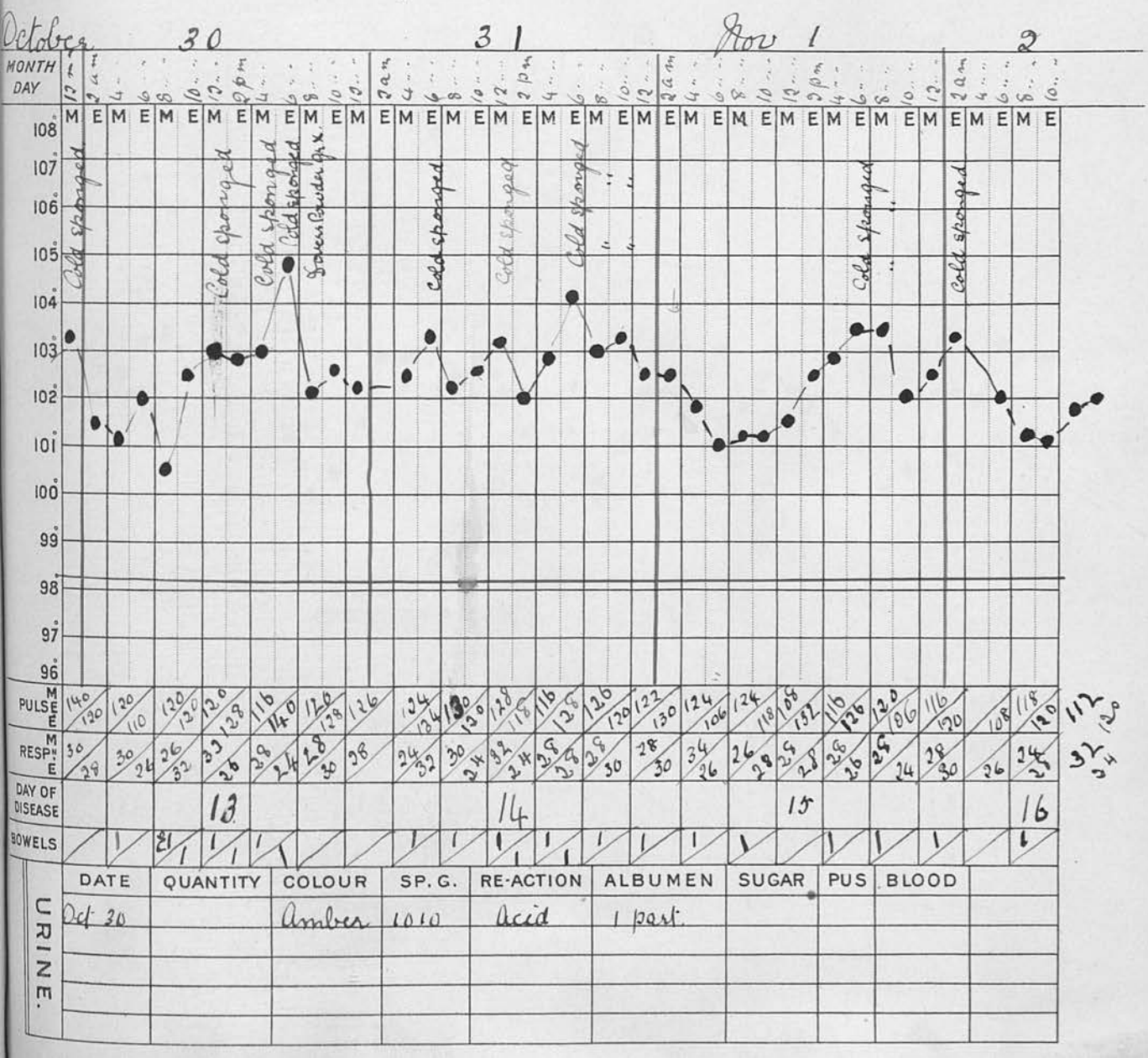
Admitted Oct: 21-04

Patients Name Sarah Wilkinson

Age 23

Discharged

Disease



URINE.

DATE	QUANTITY	COLOUR	SP. G.	RE-ACTION	ALBUMEN	SUGAR	PUS	BLOOD	
Oct 30		Ambers	1010	Acid	1 post.				

Physician Dr. Petch.

Admitted Oct: 21. 04

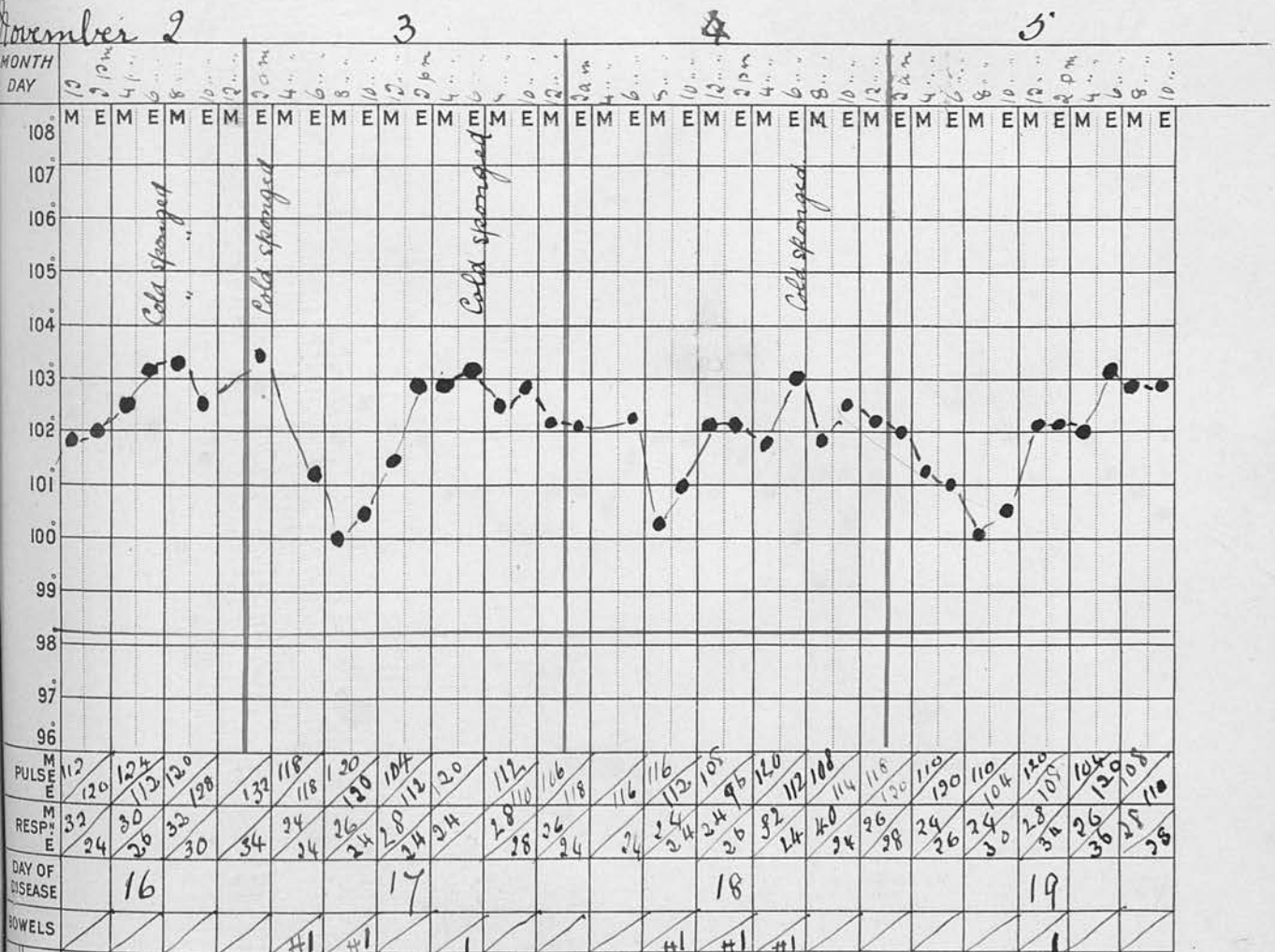
Patients Name Sarah Wilkinson Age 23

Disease

Discharged

Haemorrhage of Uterus. 2 Dr.

Haem. all night. 3 Dr.



| | | |

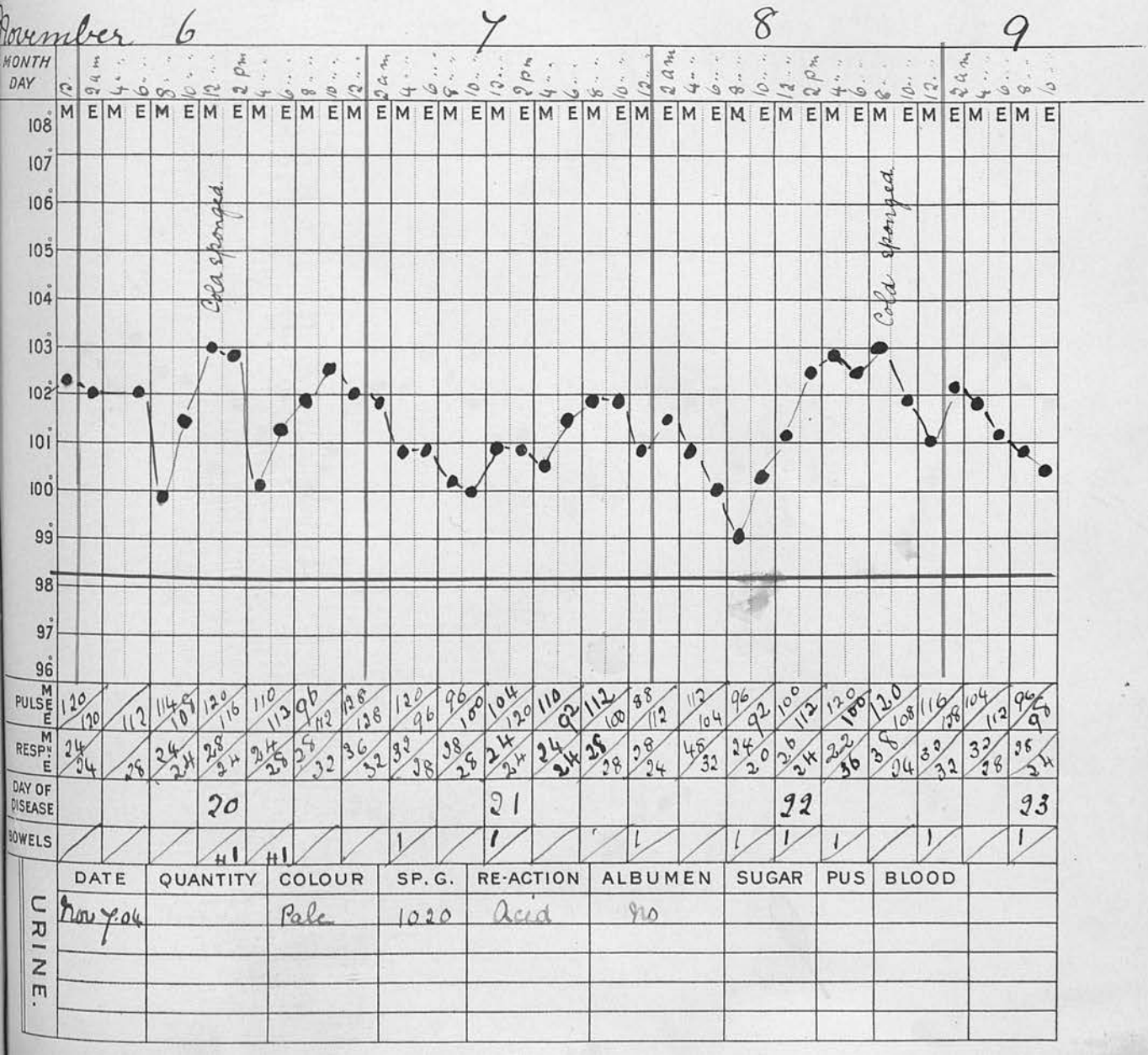
Physician Dr. Petch

Admitted Dec. 21. 04

Patients Name Sarah Wilkinson Age 23. Discharged

Disease

Haemorrhage 2 Kidneys.



URINE.

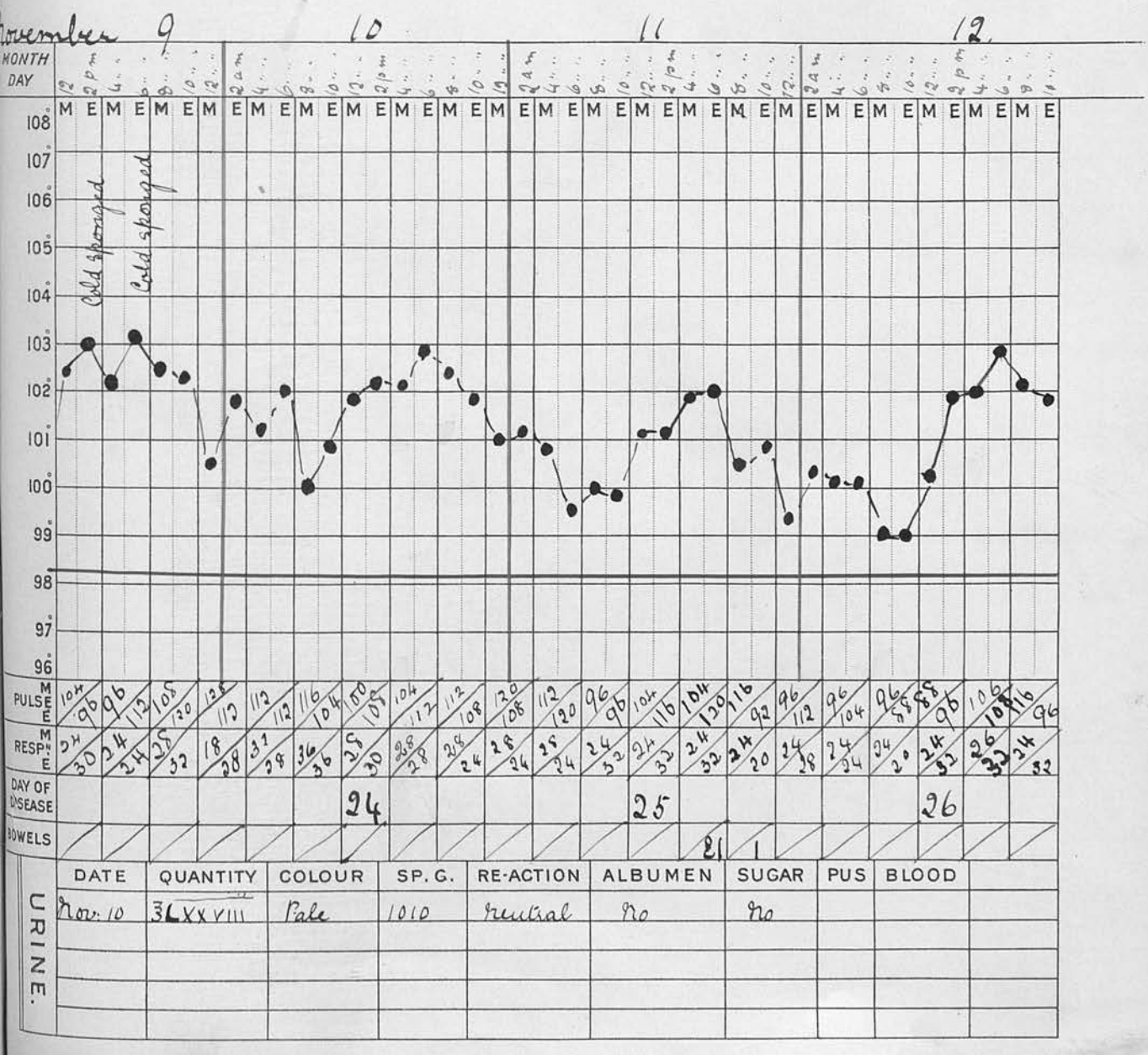
DATE	QUANTITY	COLOUR	SP. G.	RE-ACTION	ALBUMEN	SUGAR	PUS	BLOOD	
Nov 7 04		Pale	1020	Acid	No				

Physician Dr. Pelch

Admitted Dec: 21. 04

Patients Name Sarah Wilkinson Age 23. Discharged

Disease



URINE.

DATE	QUANTITY	COLOUR	SP. G.	RE-ACTION	ALBUMEN	SUGAR	PUS	BLOOD
Nov: 10	3LXXVIII	Pale	1010	Neutral	No	No		

Physician Dr. Petch

Admitted Oct 21. 04

Patient's Name Sarah Wilkinson

Age 23 Discharged

Disease

Sudden pain. Collapse & all symptoms of Perforation. L. —

Enema. Quart. + Turp.

Diem. 1. 2. 3.

November 13 14 15 16

MONTH DAY

Hyp. Syr. morphia + Atropine gtt. 30 at 12 a.m.

Hypo. Syr. morph. gtt 4 Atropine gtt. 6 at 3.30

Hypo. Syr. morph. gtt 4 Atropine gtt. 6 at 3.30

Hypo. Syr. morph. gtt 4 Atropine gtt. 6 at 3.30

Hypo. Syr. morph. gtt 4 Atropine gtt. 6 at 3.30

Hypo. Syr. morph. gtt 4 Atropine gtt. 6 at 3.30

Hypo. Syr. morph. gtt 4 Atropine gtt. 6 at 3.30

Vomited

	M	E	M	E	M	E	M	E	M	E	M	E	M	E	M	E	M	E	M	E	M	E	M	E	M	E	M	E	M	E	M	E
108°																																
107°																																
106°																																
105°																																
104°																																
103°																																
102°																																
101°																																
100°																																
99°																																
98°																																
97°																																
96°																																

M PULSE E	120	124	128	136	96	96	108	104	108	112	120	120	120	120	120	120	112	112	120	108	112	112	116	112	108	96	96	82	100	96	96	92	116	96	150	112	88	96	88	96	96
M RESPN. E	28	28	32	32	26	26	18	20	20	20	20	18	24	24	24	24	20	24	18	18	18	22	18	28	20	24	14	14	16	18	20	20	20	16	22	26	24	20	20	20	24	22	96
DAY OF DISEASE							27												28											29										
BOWELS														1					1	1	1		1			1	1		1	1		1			1				1		

URINE.

DATE	QUANTITY	COLOUR	SP. G.	RE-ACTION	ALBUMEN	SUGAR	PUS	BLOOD

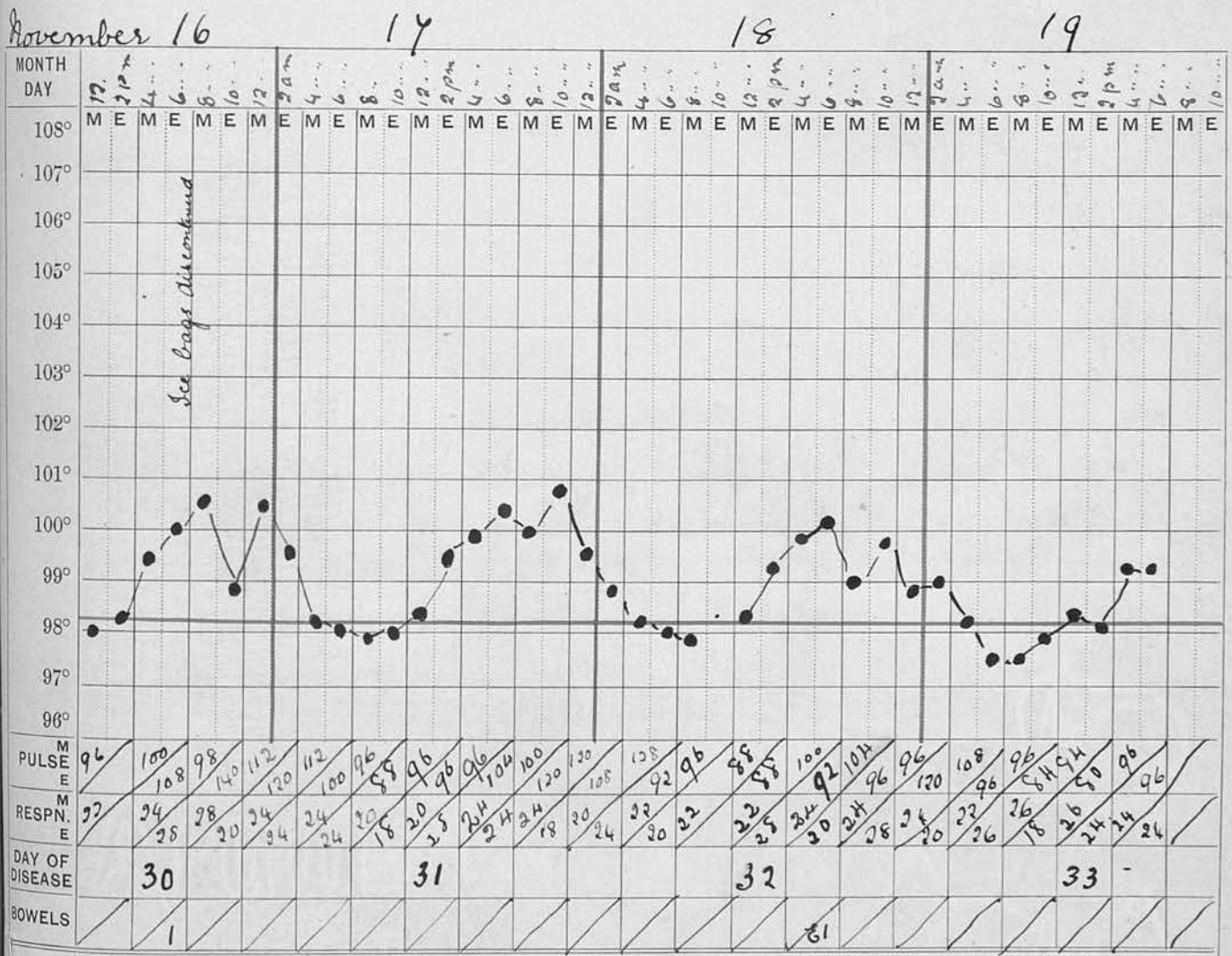
Physician Dr Petch

Admitted Oct: 21.04.

Patient's Name Sarah Wilkinson

Age 23 Discharged

Disease



URINE.

DATE	QUANTITY	COLOUR	SP. G.	RE-ACTION	ALBUMEN	SUGAR	PUS	BLOOD
Nov 16		Amber	1015	Alk	No	No		No

1000—10/04 Verity Hospl

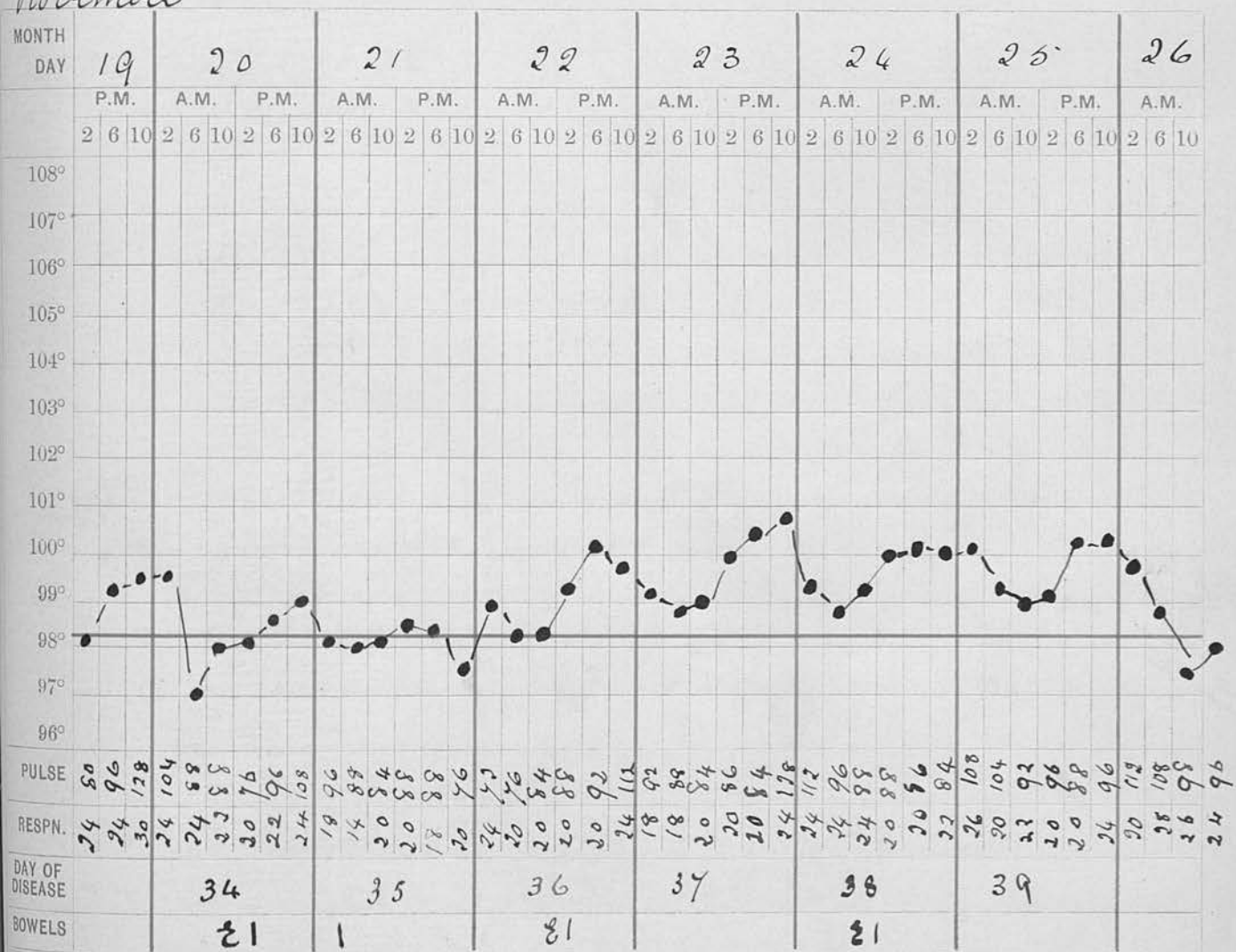
Admitted
Dec: 21. 04.

Patient's Name Sarah Wilkinson

Age 93 Discharged

Disease

November



URINE.

DATE.	QUANTITY	COLOUR	SP. G.	RE-ACTION	ALBUMEN	SUGAR	PUS	BLOOD

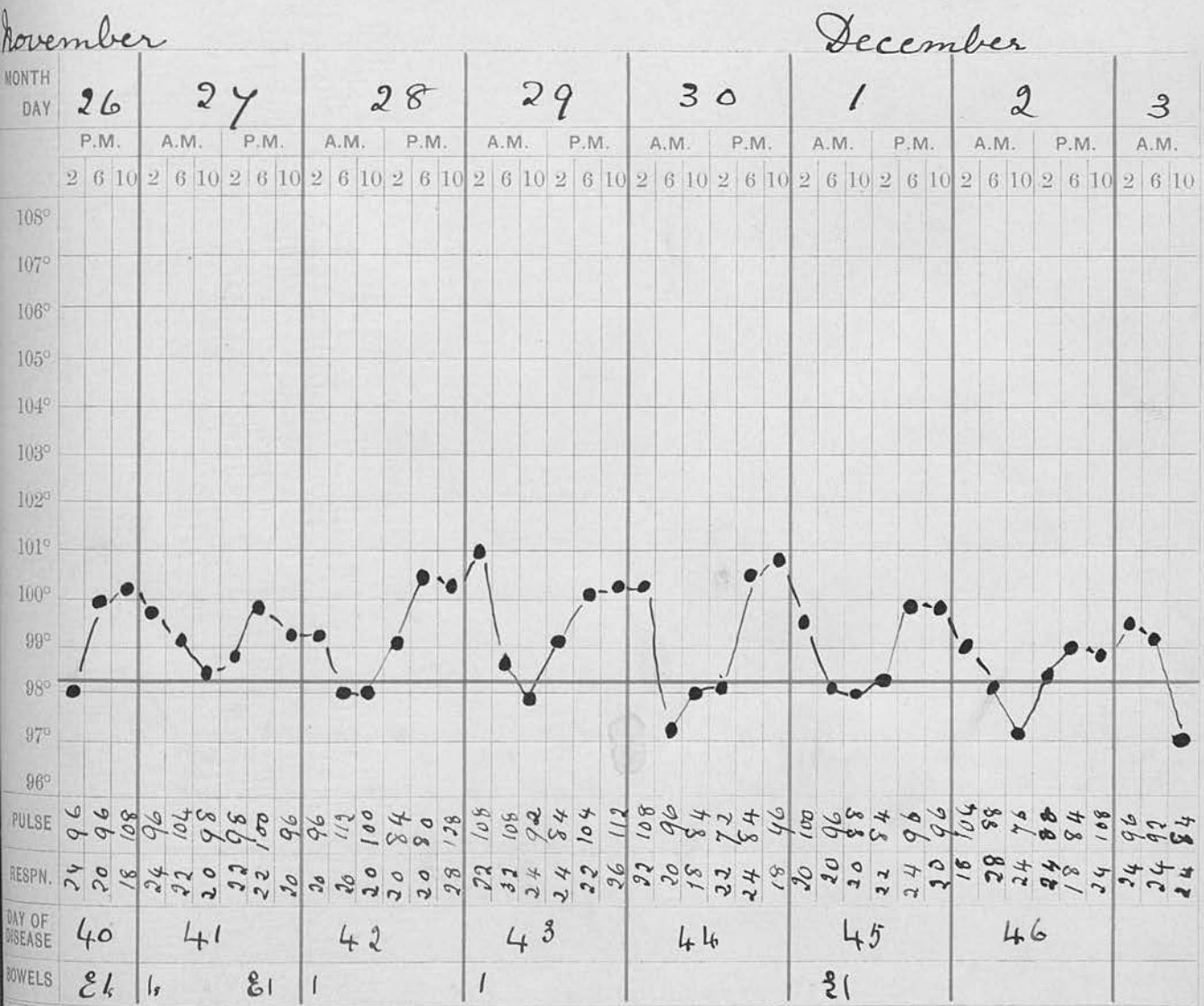
200—10/08—Yorks. Herald

Admitted
Oct: 21. 04

Patient's Name Sarah Wilkinson

Age 23 Discharged

Disease



URINE.

DATE.	QUANTITY	COLOUR	SP. G.	RE-ACTION	ALBUMEN	SUGAR	PUS	BLOOD

Admitted
Oct 21. 04.

Patient's Name Sarah Wilkinson

Age 23 Discharged

Disease

December

MONTH		3			4																												
DAY																																	
		P.M.			A.M.			P.M.			A.M.			P.M.			A.M.			P.M.			A.M.			P.M.			A.M.			P.M.		
		2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10
PULSE		72	84	92	88	92	84	80	90	96	96	88	78	84	84	108	106	72	72	74	72	80	84	80	72	72	72	68	88	80	72	72	48	48
RESPN.		20	24	24	24	24	28	20	20	24	24	20	24	32	20	20	20	32	18	22	18	20	18	20	18	20	20	20	24	20	20	18	18	20
DAY OF DISEASE		4 7			1						2						3						4						5					
BOWELS		21									21												21											

URINE.	DATE.	QUANTITY	COLOUR	SP. G.	RE-ACTION	ALBUMEN	SUGAR	PUS	BLOOD

Physician Dr. Petch.

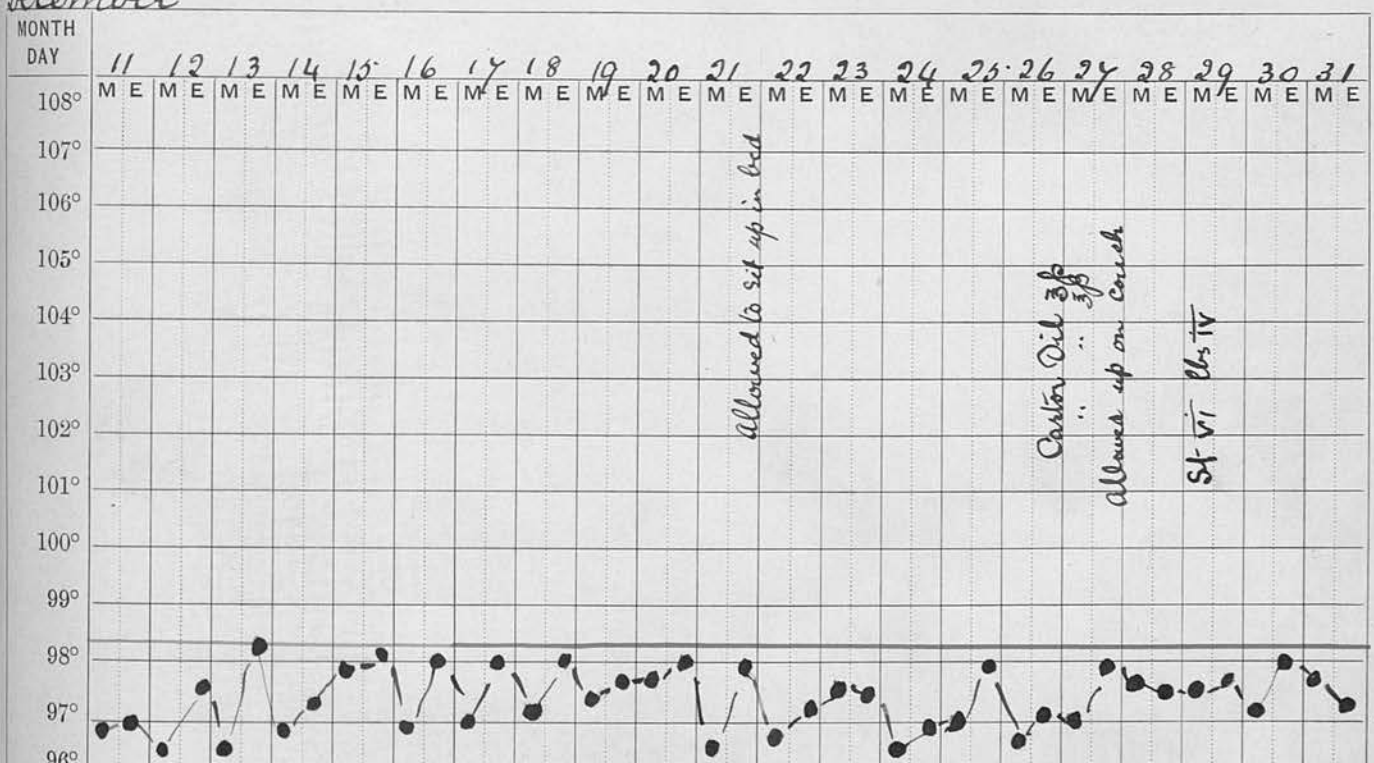
Admitted Oct. 21. 04.

Patient's Name Sarah Wilkinson

Age 23. Discharged

Disease

December



| | | |

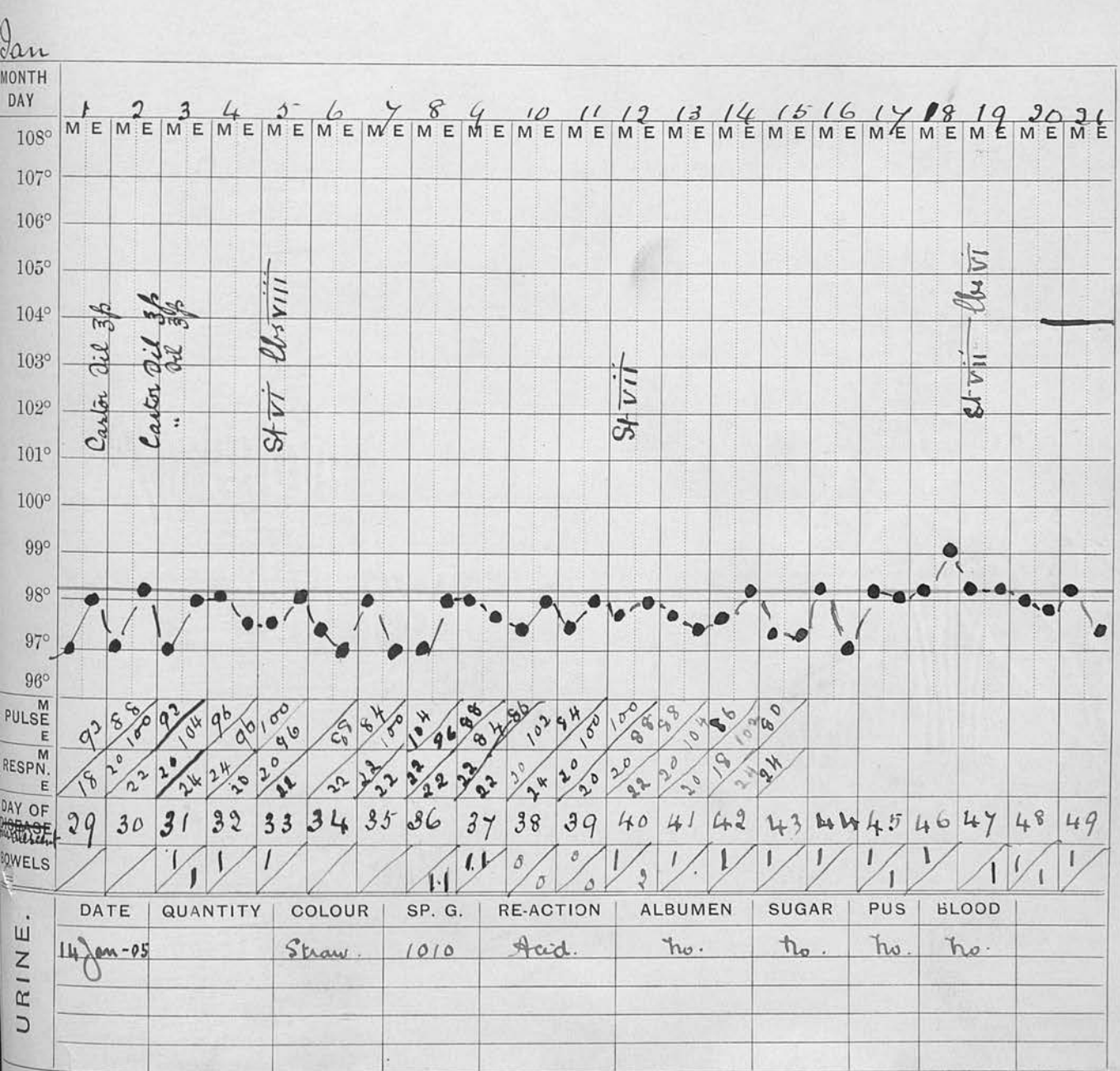
Physician Dr. Petch

Admitted Oct 21.04

Patient's Name Sarah Wilkinson

Age 23 Discharged

Disease



URINE.

DATE	QUANTITY	COLOUR	SP. G.	RE-ACTION	ALBUMEN	SUGAR	PUS	BLOOD	
14 Jan-05		Straw.	1010	Acid.	No.	No.	No.	No.	

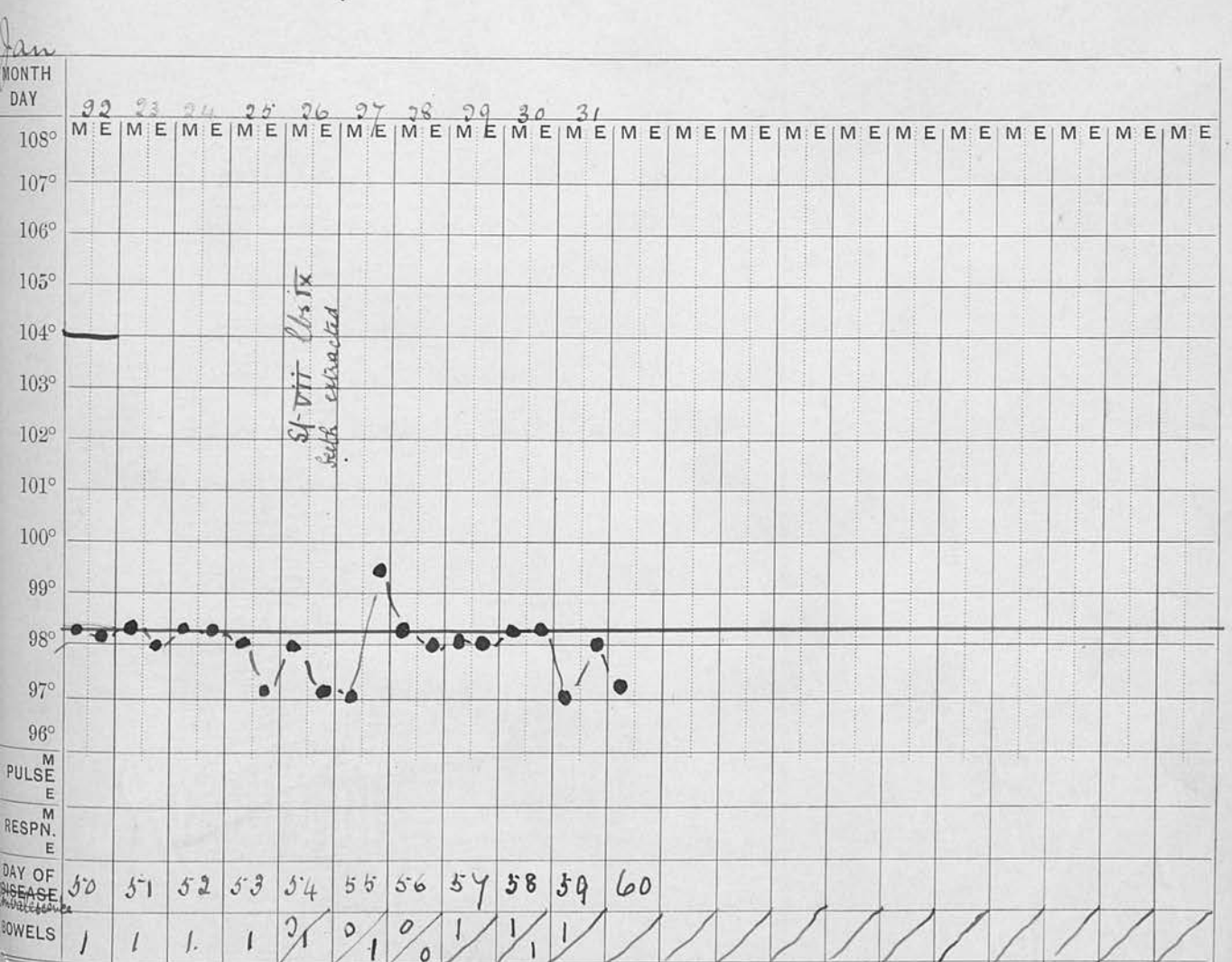
Physician Dr Petch

Admitted Oct 21. 05:

Patient's Name Sarah Wilkinson

Age 23 Discharged

Disease



URINE.

DATE	QUANTITY	COLOUR	SP. G.	RE-ACTION	ALBUMEN	SUGAR	PUS	BLOOD

8 Copy

Register.

DR. PETCH.

WARD. 6

Godsworth Sarah Eliza

34. Occupn. Home.

ce 1 Bishopsgate Street

Recomd. by S. Johnson.

Date of { Admission Oct 22nd 1904
Discharge Dec. 31st 1904

DISEASE.

Single, or Widod.

Enteric Fever

Result C.

.	TREATMENT.	DATE.	DIET.
.04	Rx Acetozone fr x Syr Aurantii ℥ ij ss Aq ad ℥ j ℥ iv Every 2 hours. " Every 4 hours " t.d.s 22.11. Stop	22.10.04.	Milk ℥ iij 3.d.
		1.11.04.	Rusks Arrowroot
04.		3.11.	Bengers Food
04.		5.11.	Low.
		8.11.	Fish, Chicken
.04.	Mist. ol Morrhuae ℥ j t.d.s. p.c. Stop 11.11.	11.11.	Milk ℥ iij
		20.11	Low.
04	Syr Ferri Phosph c Quin et Strych. Syr Aurantii aa ℥ ss. t.d.s, p.c.	25.11.	Fish, Chicken
		30.11.	Medium.
11.04.	Ol Ricini ℥ ss. S.O.S.		

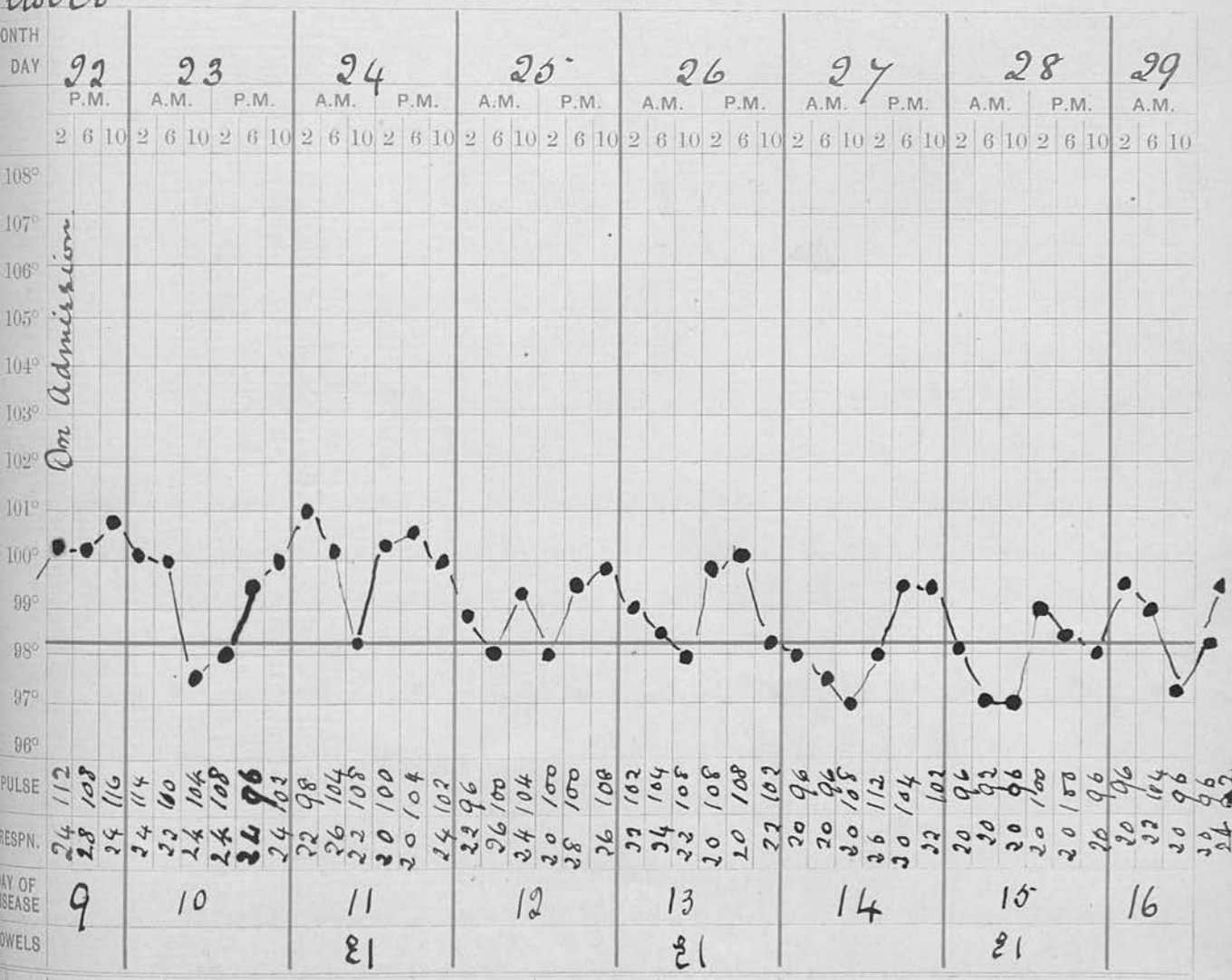
Admitted
Oct: 22. 04

Patient's Name Sarah Eliza Dodworth

Age 34 Discharged

Disease

October



URINE.

DATE.	QUANTITY	COLOUR	SP. G.	RE-ACTION	ALBUMEN	SUGAR	PUS	BLOOD
Oct. 25		Pale	1005	Acid	No	No		

Admitted
Oct 22-04.

Patient's Name Sarah Dodsworth

Age 34. Discharged

Disease

October Nov

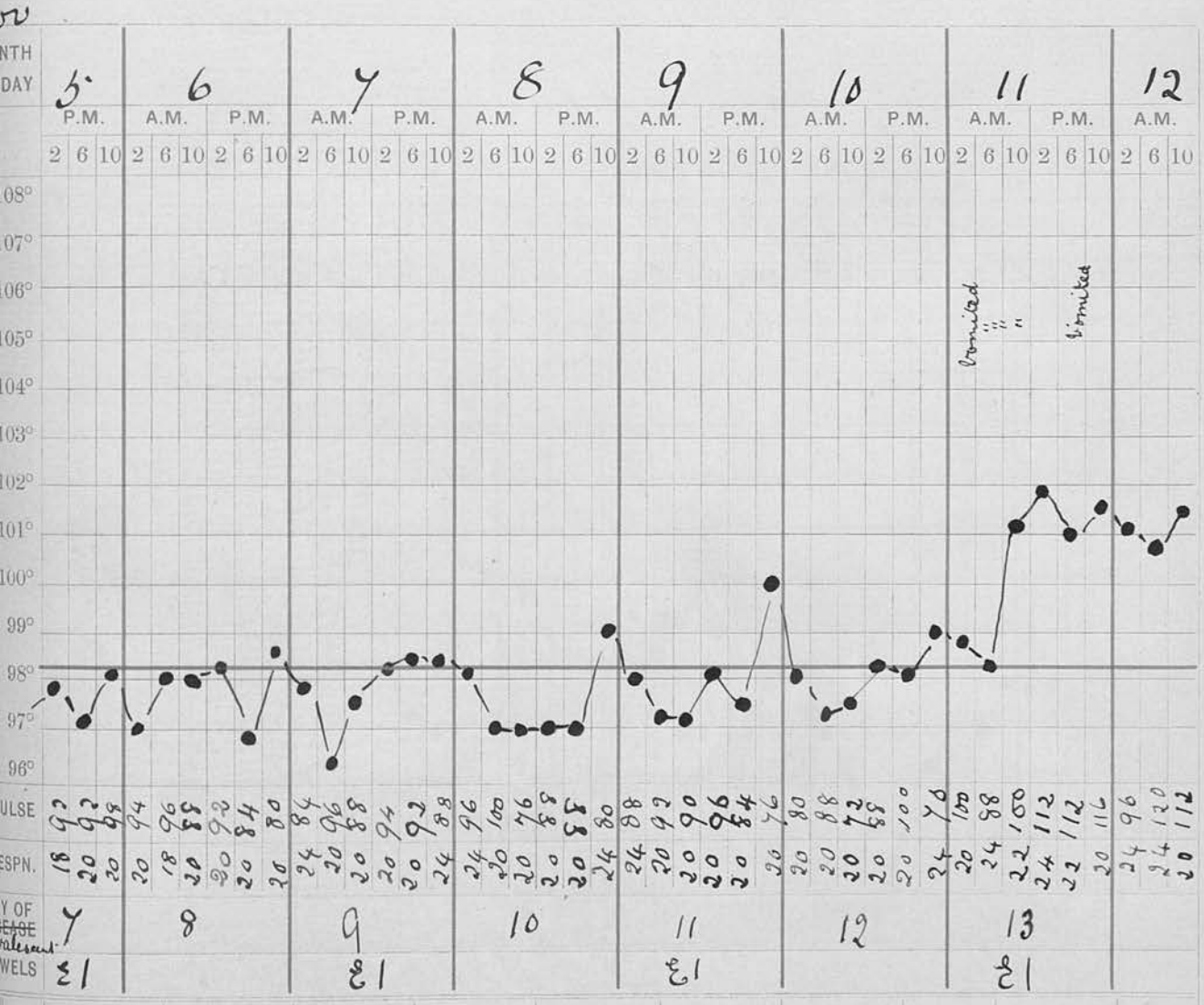
| MONTH | | |

Admitted
Oct: 22. 04

Patient's Name Sarah Dodsworth

Age 34. Discharged

Disease



URINE.

DATE.	QUANTITY	COLOUR	SP. G.	RE-ACTION	ALBUMEN	SUGAR	PUS	BLOOD

Physician Dr. Pelch

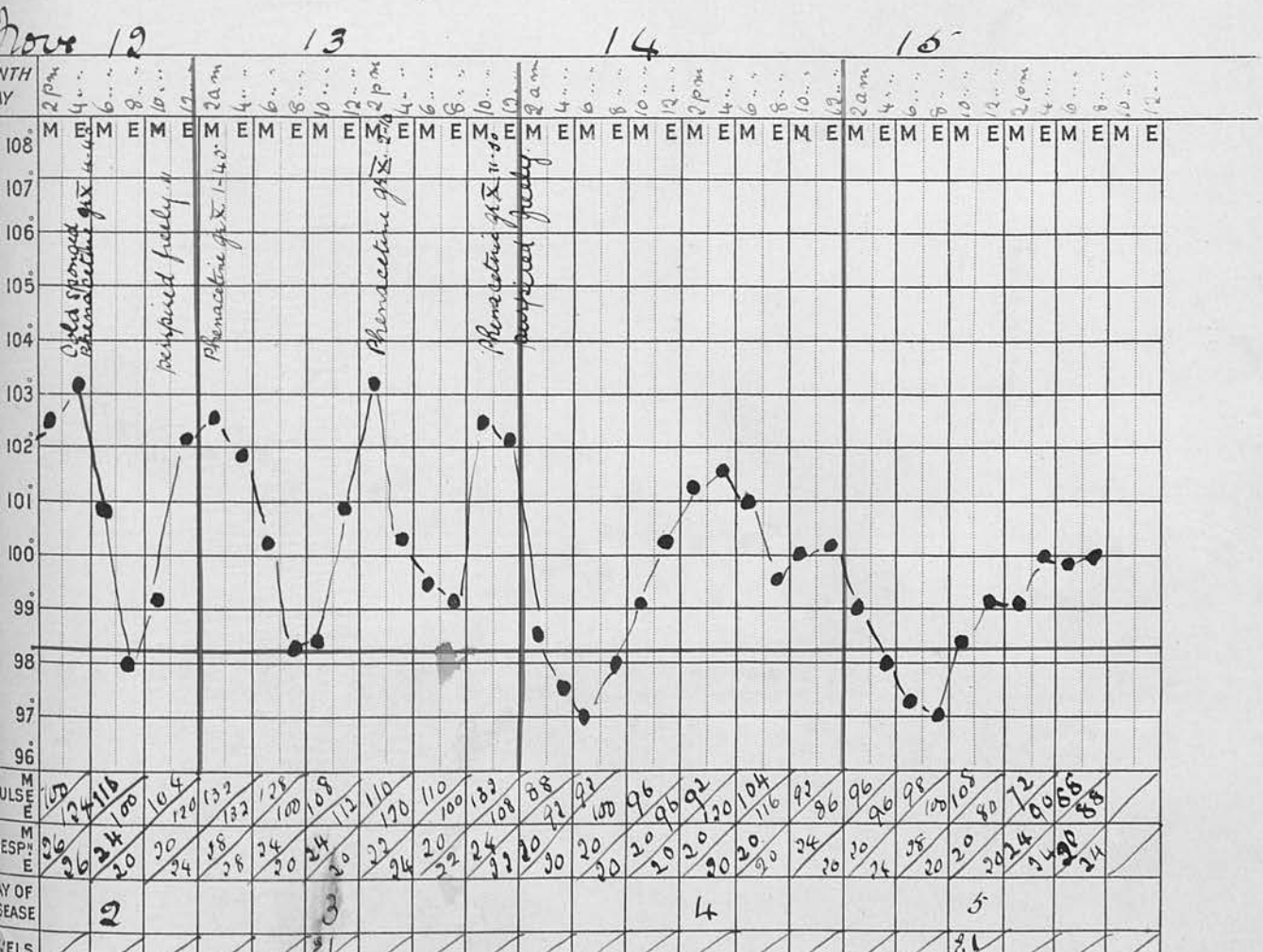
Admitted Oct: 22.04

Patients Name Sarah Dodsworth

Age 34. Discharged

Disease

This recrudescence I attribute to Influenza which was present in wards at this time.



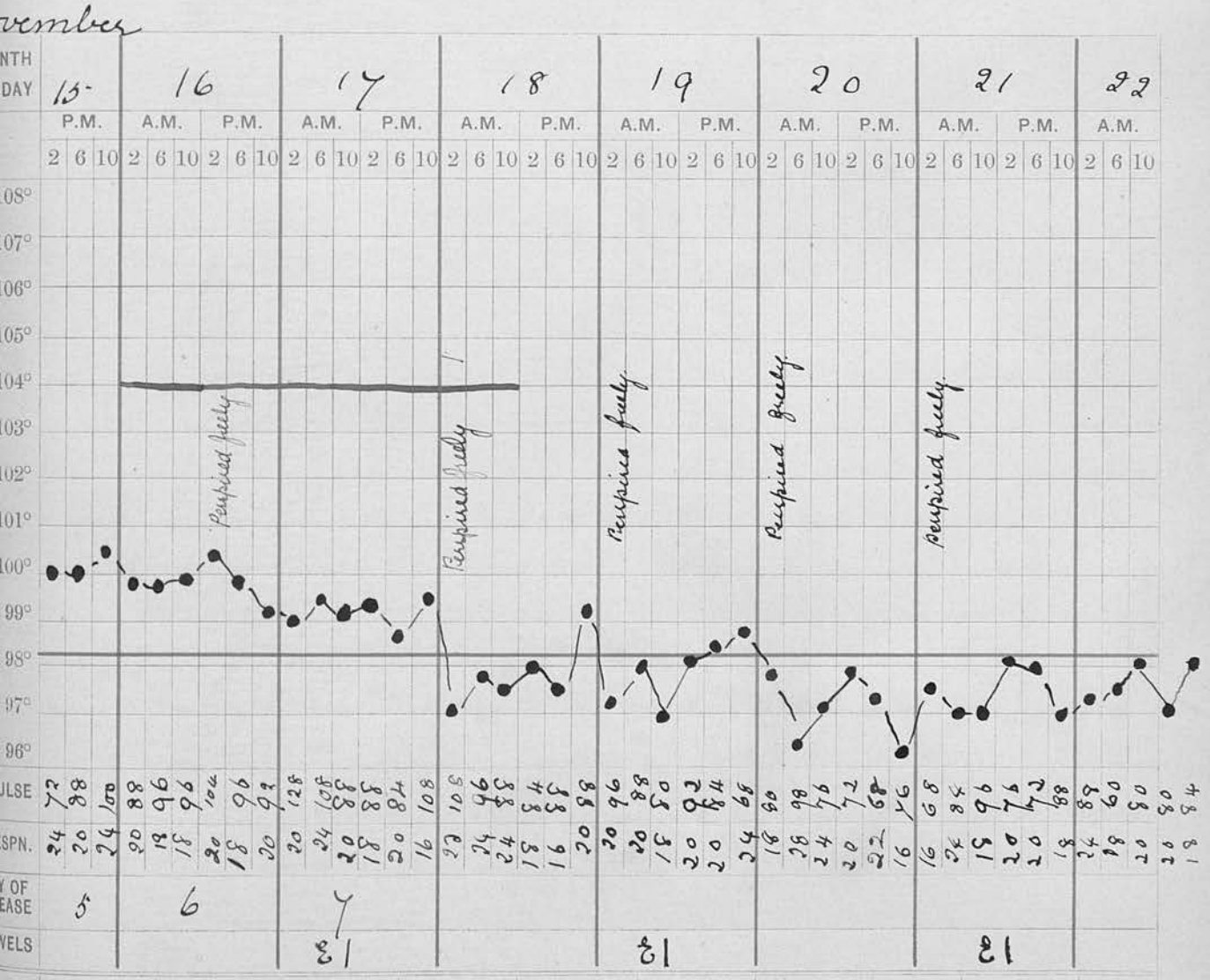
	DATE	QUANTITY	COLOUR	SP. G.	RE-ACTION	ALBUMEN	SUGAR	PUS	BLOOD
URINE.	Nov: 14		Amber		Acid	No	No		No

Admitted
Oct. 22. 04

Patient's Name Sarah Dodsworth

Age 34 Discharged

Disease



URINE.

DATE.	QUANTITY	COLOUR	SP. G.	RE-ACTION	ALBUMEN	SUGAR	PUS	BLOOD

Admitted
Oct. 22. 04

atient's Name Sarah Dodsworth

Age 34 Discharged

Disease

ovember

	22			23						24						25						26						27						28						29		
ITH																																								
DAY	P.M.			A.M.			P.M.			A.M.			P.M.			A.M.			P.M.			A.M.			P.M.			A.M.			P.M.			A.M.			P.M.			A.M.		
	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10
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SPN.	20	18	20	20	20	22	22	20	20	20	20	20	20	20	20	20	20	20	20	20	20	18	20	20	18	20	20	18	20	20	20	20	24	18	18	20	18	19	20			
OF ASE																																									
ELS																																									

Castor Oil 3ss.

DATE.	QUANTITY	COLOUR	SP. G.	RE-ACTION	ALBUMEN	SUGAR	PUS	BLOOD

URINE.

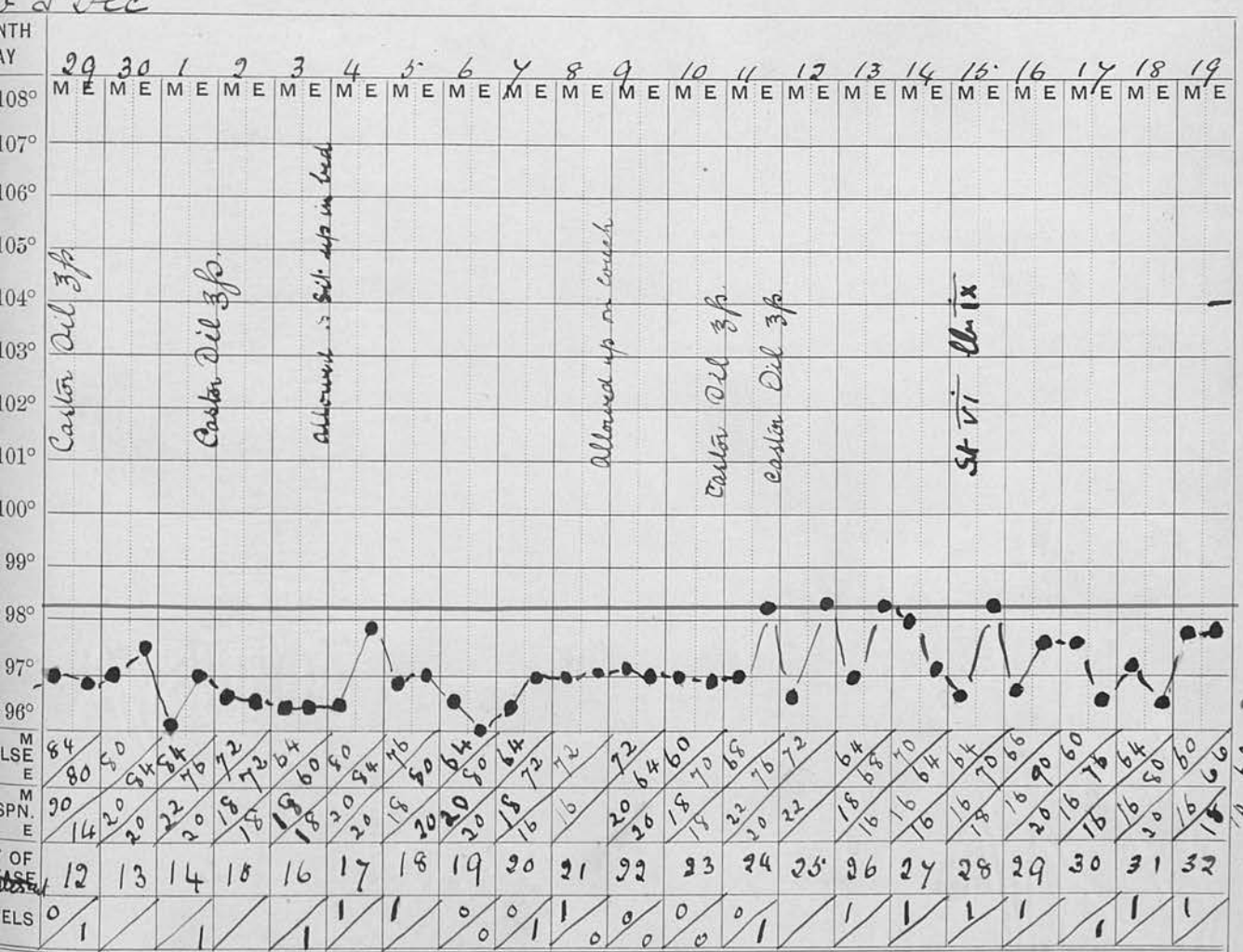
Physician Dr. Petch

Admitted Oct. 22. 04

Patient's Name Sarah Dodsworth

Age 34 Discharged

Disease



DATE	QUANTITY	COLOUR	SP. G.	RE-ACTION	ALBUMEN	SUGAR	PUS	BLOOD	

URINE.

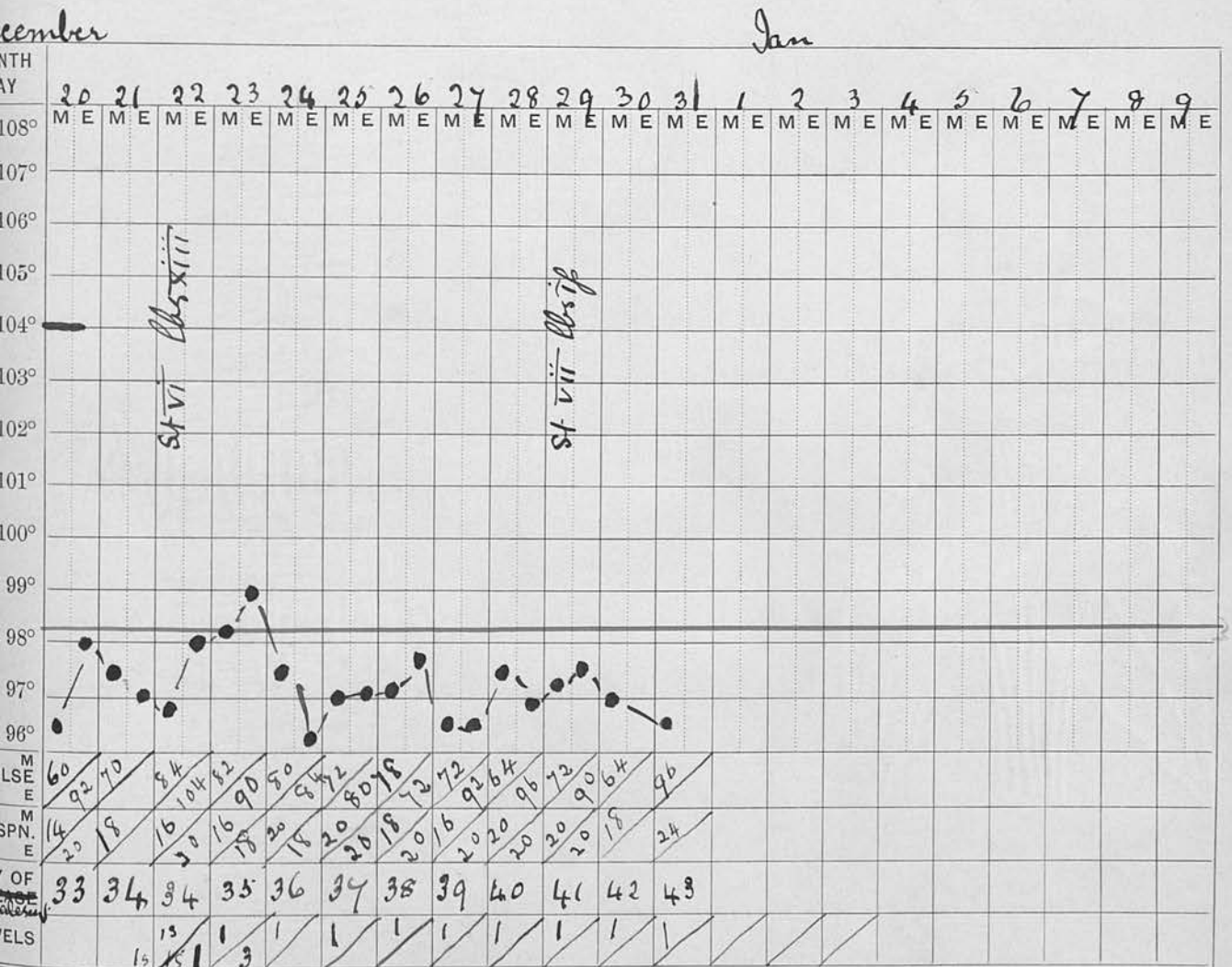
Physician Dr. Petch

Admitted Oct: 22. 04

Patient's Name Sarah Dodsworth

Age 34 Discharged

Disease



DATE	QUANTITY	COLOUR	SP. G.	RE-ACTION	ALBUMEN	SUGAR	PUS	BLOOD

URINE.

7.
ister.

DR. PETCH.

WARD Vic

Marshall Mary Eliz.th
Occupn.
4 Black Horse Passage
Hungate

Recomd. by W. Lazenby.
Date of { Admission Oct 26th 1904.
Discharge Dec: 7th 1904.

DISEASE.
Enteric

ngle, or Widod.

Result C

	TREATMENT.	DATE.	DIET.
10.	Acalozone fix Aq Aurant: 3ij ss Aq ad. Oj.	26.10.	Milk Oj ss Peptonised
	3iij ~~2 thirty~~.	27.10.	Beef Tea. & Mutton.
	~~(7.11) 4 thirty~~ (10.11) L-d-S.	31.11.04.	Beef Tea.
	Brit. camph Co. 3ij 2:d:s 12.11. elap.		Custard.
	5.0.S.		~~Mutton Selock~~ Scotch
			Bread & Milk.
1.04.	Mist Morphinae 3ss Syp Zanc: Bromid Co. 3ss.		Pudding
			Bread & Butter.
	L-d-S. p.c.	7.11.04	Ordinary

5
30
7
42

Admitted
Oct. 26th/04

tient's Name "Mary" Elizabeth Marshall

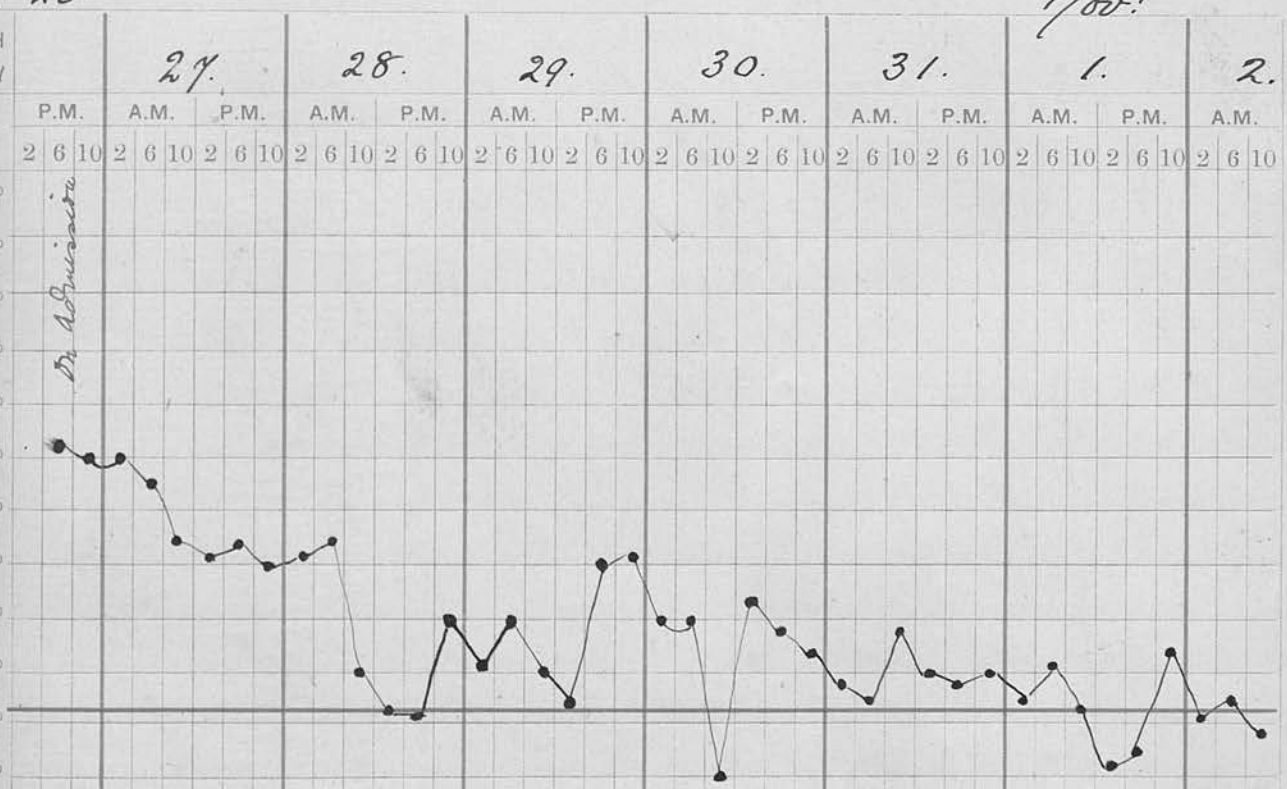
Age 4

Discharged

Disease

: 26.

Gov:



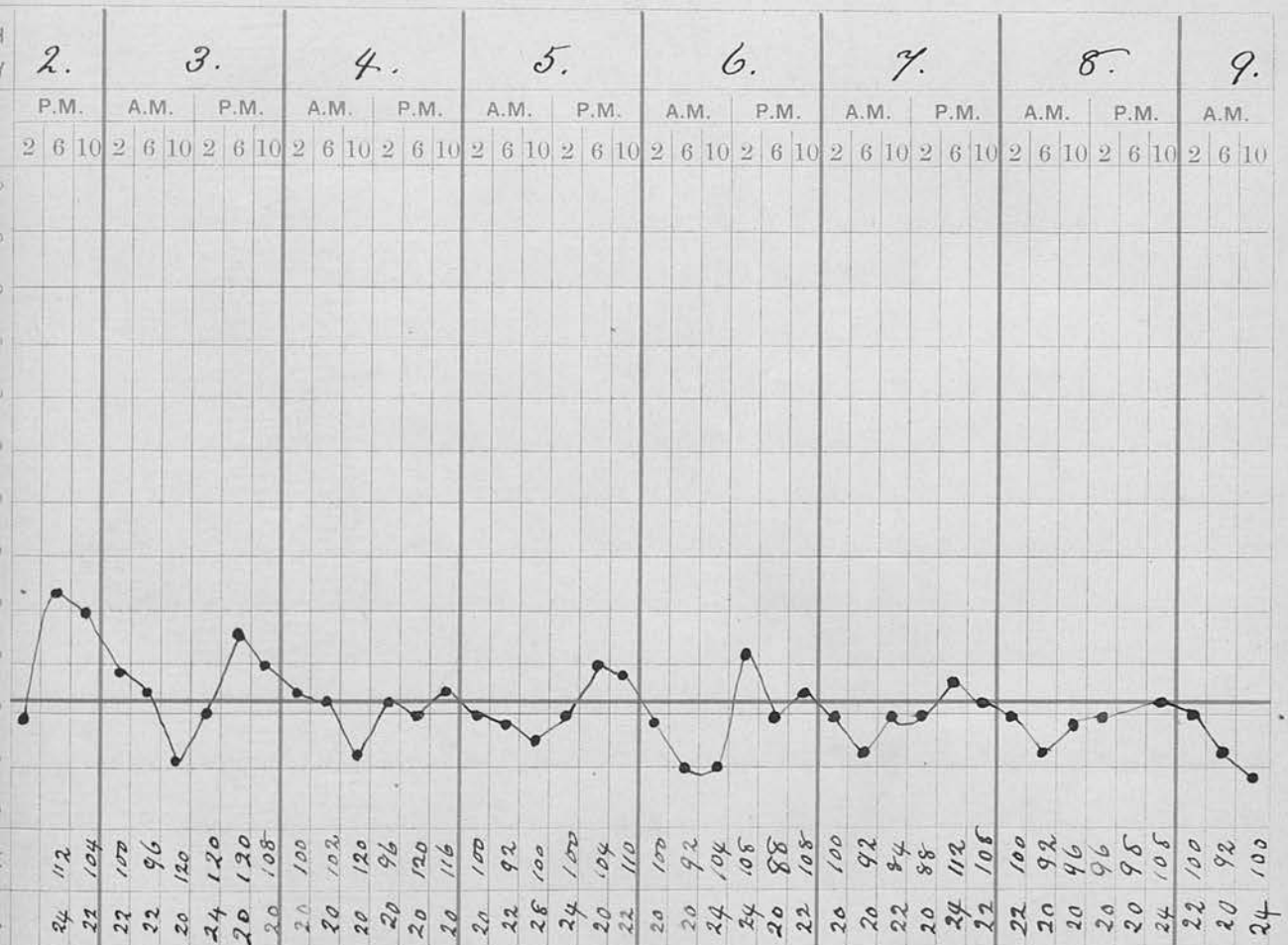
DATE.	QUANTITY	COLOUR	SP. G.	RE-ACTION	ALBUMEN	SUGAR	PUS	BLOOD

Admitted
Oct: 26th 1904.

tient's Name "Mary" Marshall.

Age 4. Discharged

Disease



DATE.	QUANTITY	COLOUR	SP. G.	RE-ACTION	ALBUMEN	SUGAR	PUS	BLOOD

Admitted
Oct: 26th 1904.

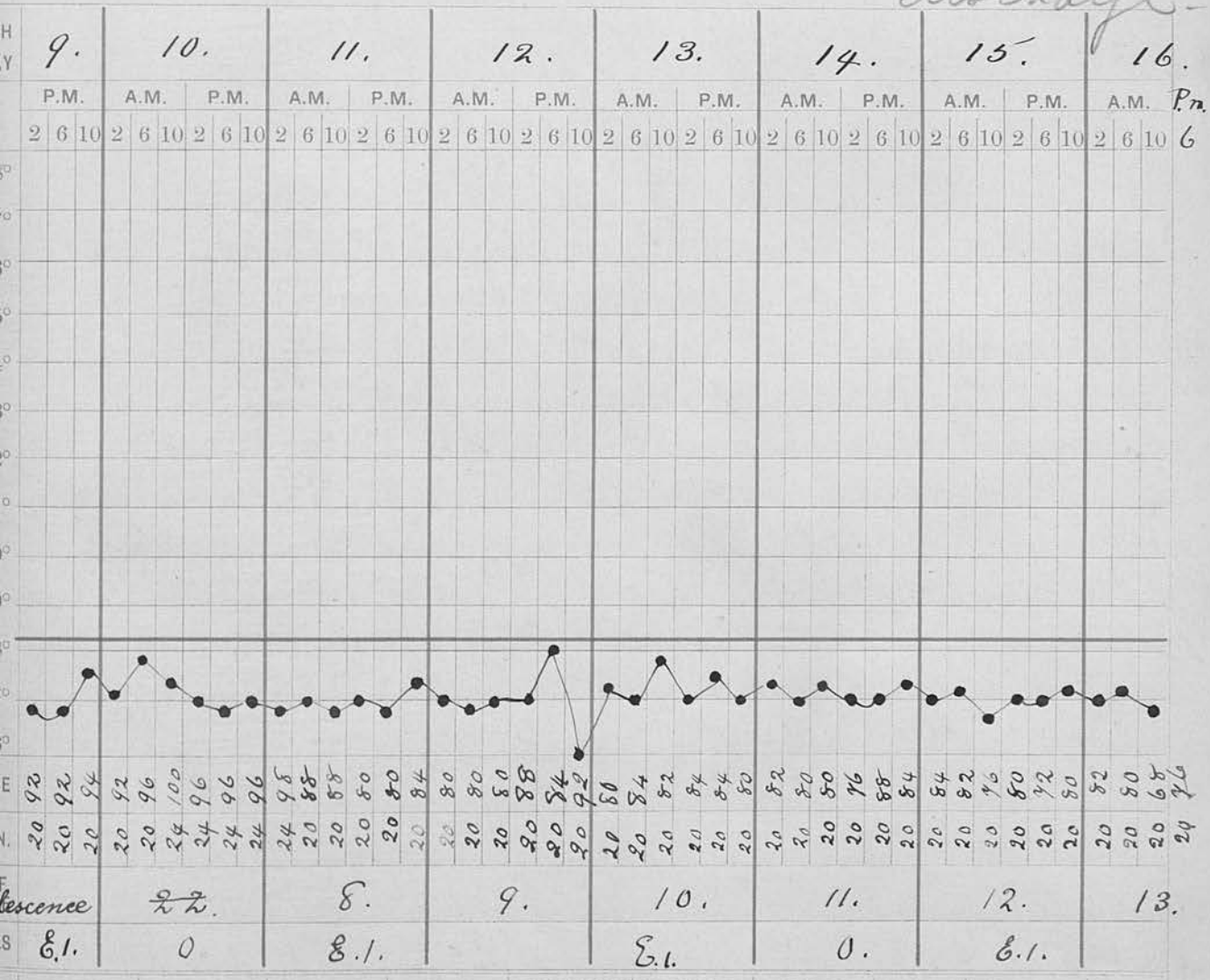
tient's Name "Mary" Marshall

Age 4

Discharged

Disease

T° Normal till discharge.


9.
10.
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P.M.
A.M.
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A.M.
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P.M.
A.M.
P.M.
2 6 10 2 6 10 2 6 10

DR. TURNER.

WARD. ~~Fic~~

Cooper Joseph — Recomd. by T. B. Whytehead

Occupn. — Date of Admission Nov. 1. 1904.

Booth's Yard — Discharge Dec. 31-1904

DISEASE.

gle, or Widod. — Enteric — Result C

TREATMENT.	DATE.	DIET.
Brit. Camph. Co. 3ss. 8. o. s.	1. 11.	Milk ℥ij p. b.
Cold Sponge if T° over 103°.	11. 12.	Bread & milk Pudding Custard
℞ Tinct Belladon Tinct Hyoscyam Syrup simp. aam ℥v ad 3i T. D. S.	22. 12.	Medium Mince & fish (No potatoes)
Brit. ol Bromhad. 3j - 2-d-s. p. c.		

60

Dr. Turner

Patient's Name Joseph Cooper

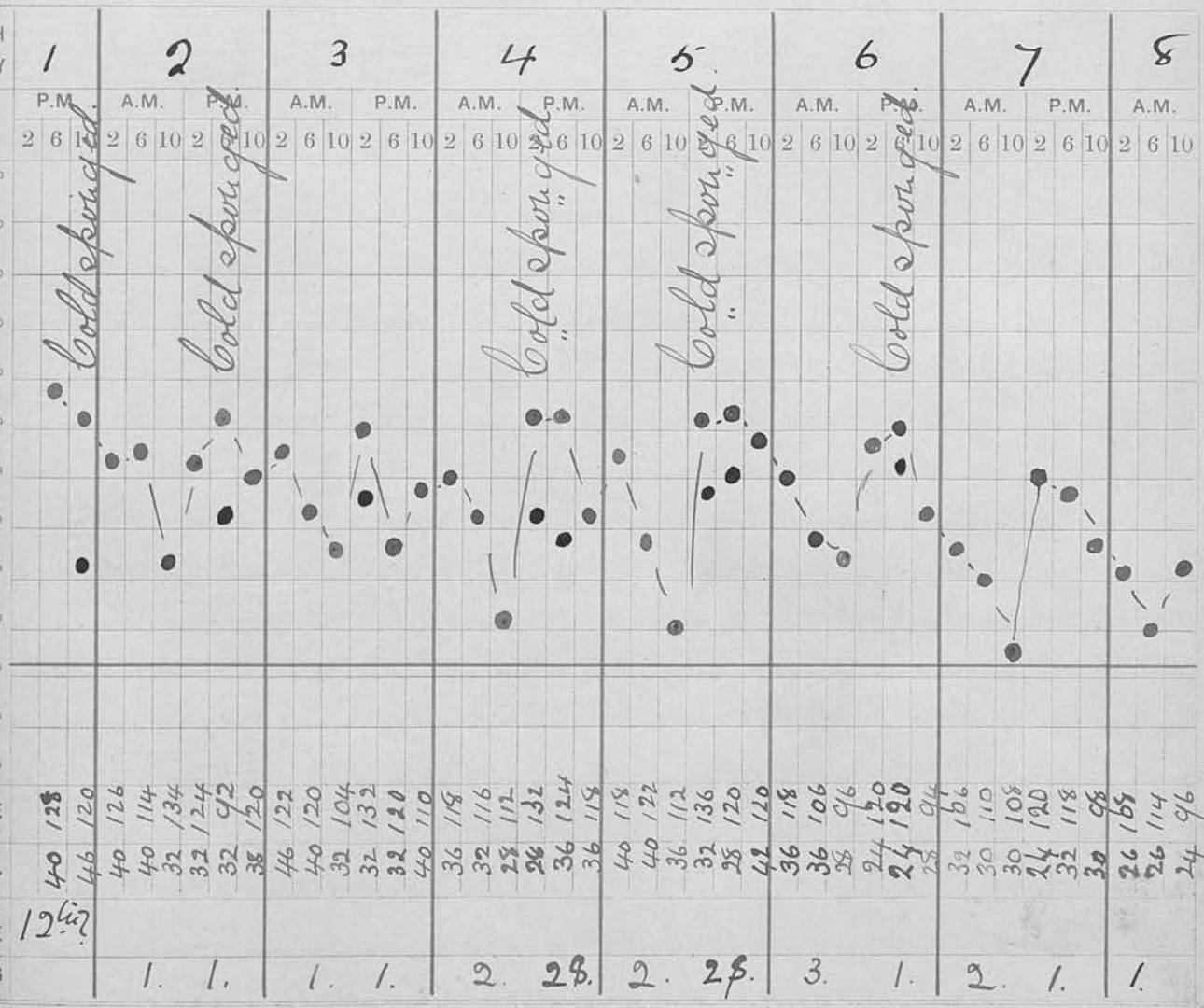
Age 9

Admitted Nov 1. 04

Disease

Discharged

Nov.



| | | |

Dr. Turner

Patient's Name Joseph Cooper

Admitted Nov. 1-04

Age 7

Discharged

Disease

Nov.

MONTH		8			9						10						11						12						13						14						15		
DAY		P.M.			A.M.			P.M.			A.M.			P.M.			A.M.			P.M.			A.M.			P.M.			A.M.			P.M.			A.M.			P.M.			A.M.		
		2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10
PULSE		40	36	32	24	30	28	28	28	28	26	28	32	28	32	26	24	26	24	25	36	28	28	22	28	28	32	28	22	22	24	28	31	26	20	28	14	28	24	28	24	24	28
RESPN.		104	110	102	106	112	100	96	96	100	110	96	90	88	96	122	100	120	80	96	102	112	110	110	96	104	120	122	100	98	88	88	100	100	96	100	84	88	92	104	84	80	88
DAY OF DISEASE																																											
BOWELS					1.						1.												1.												1.						1		

URINE.

DATE.	QUANTITY	COLOUR	SP. G.	RE-ACTION	ALBUMEN	SUGAR	PUS	BLOOD
Nov. 10	Normal	1010		Acid	Clear.			

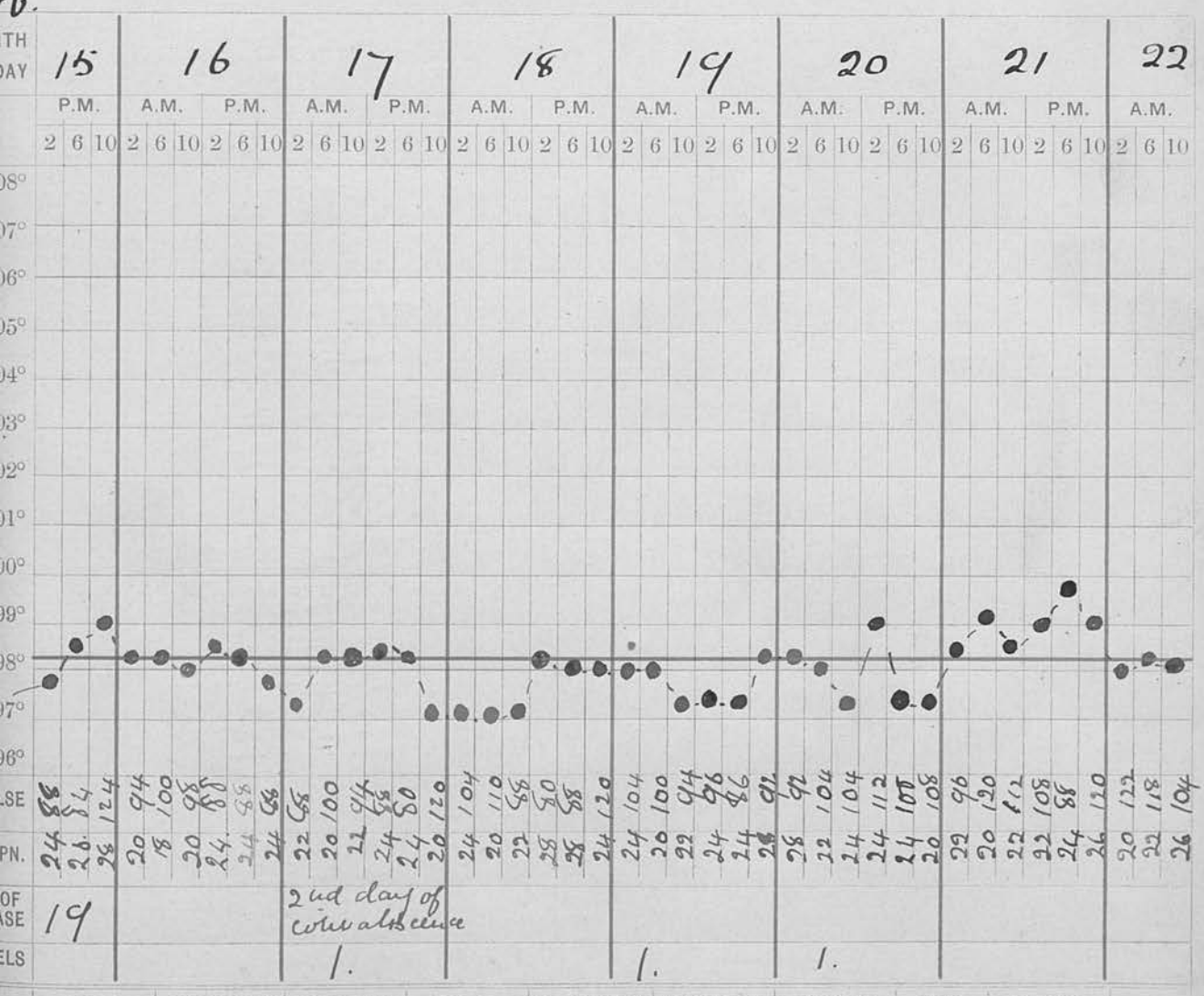
Dr. Turner.

Patient's Name Joseph Cooper. Age 7

Admitted Nov. 1-04

Disease

Discharged



DATE.	QUANTITY	COLOUR	SP. G.	RE-ACTION	ALBUMEN	SUGAR	PUS	BLOOD

URINE.

Dr. Turner

Patient's Name Joseph Cooper

Disease

Age 7

Admitted Nov. 1-04

Discharged

Nov.

MONTH		22			23									24										25										26										27										28										29		
DAY			P.M.			A.M.			P.M.			A.M.			P.M.			A.M.			P.M.			A.M.			P.M.			A.M.			P.M.			A.M.			P.M.			A.M.			P.M.			A.M.			P.M.			A.M.		
		2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10
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96°																																																										
PULSE		24	120	24	122	20	120	20	120	32	104	28	96	28	96	20	96	22	96	24	84	24	118	22	104	24	110	22	104	24	108	24	104	24	96	20	158	22	116	20	112	22	104	20	96	20	96	20	84	20	84	20	96	28	96	18	96	26	94	24	116	20	100	20	96	22	100	28	96	26	116	20	108	20	126	24	96	24	96
RESPN.		20		20		20		20		32		28		28		20		22		24		24		22		24		22		24		24		24		20		22		20		22		20		20		20		20		20		20		28		18		26		24		20		20		22		28		26		20		20		24		24	
DAY OF DISEASE		7th																																																									
BOWELS		1.												1.										1.										1.										1.																	

URINE.	DATE.	QUANTITY	COLOUR	SP. G.	RE-ACTION	ALBUMEN	SUGAR	PUS	BLOOD

Physician Dr. Turner

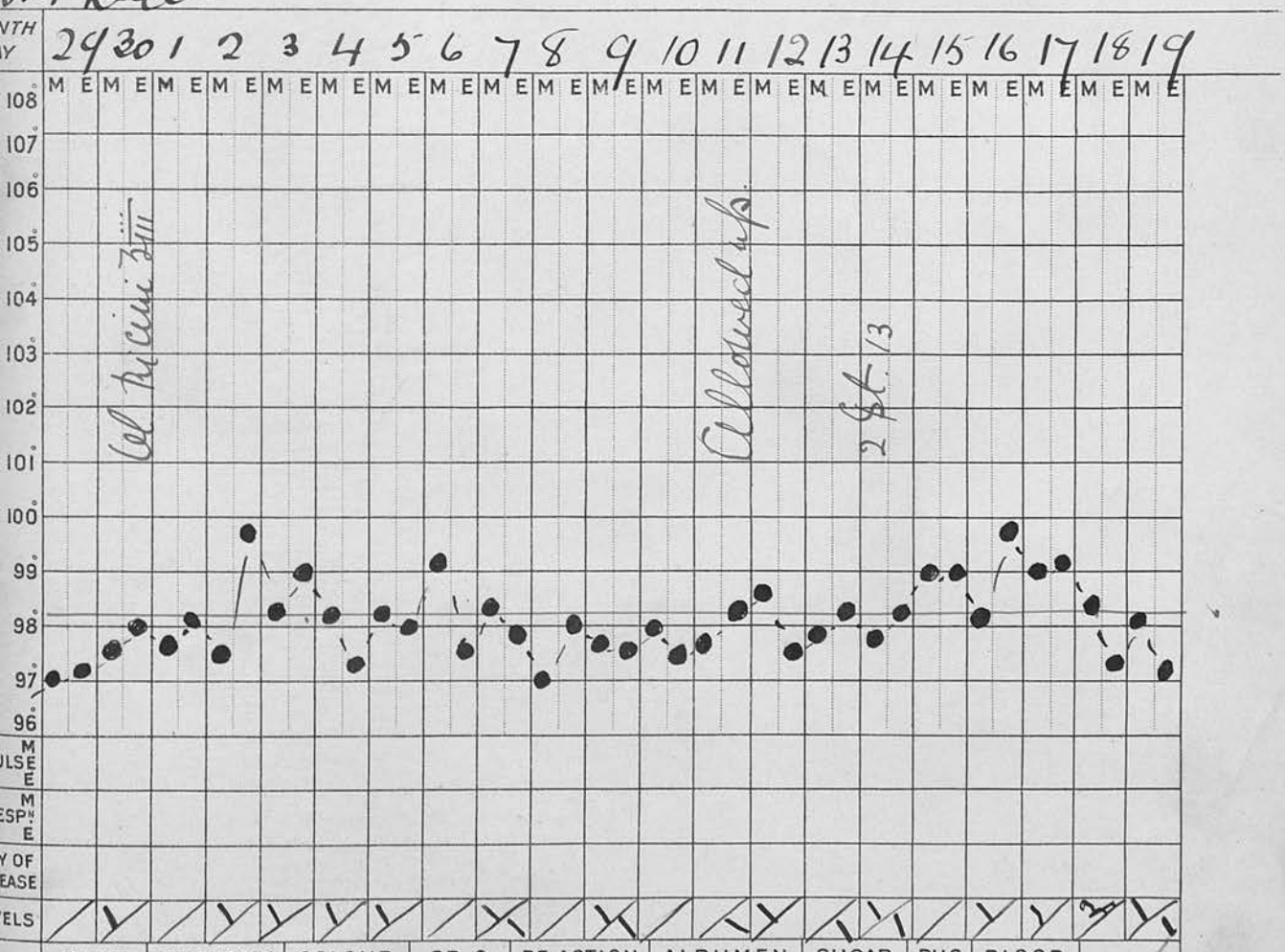
Admitted Nov. 1-04

Patients Name Joseph Cooper Age 7

Disease

Discharged

L.d Ulcer



URINE.

DATE	QUANTITY	COLOUR	SP. G.	RE-ACTION	ALBUMEN	SUGAR	PUS	BLOOD	

Physician Dr. Turner

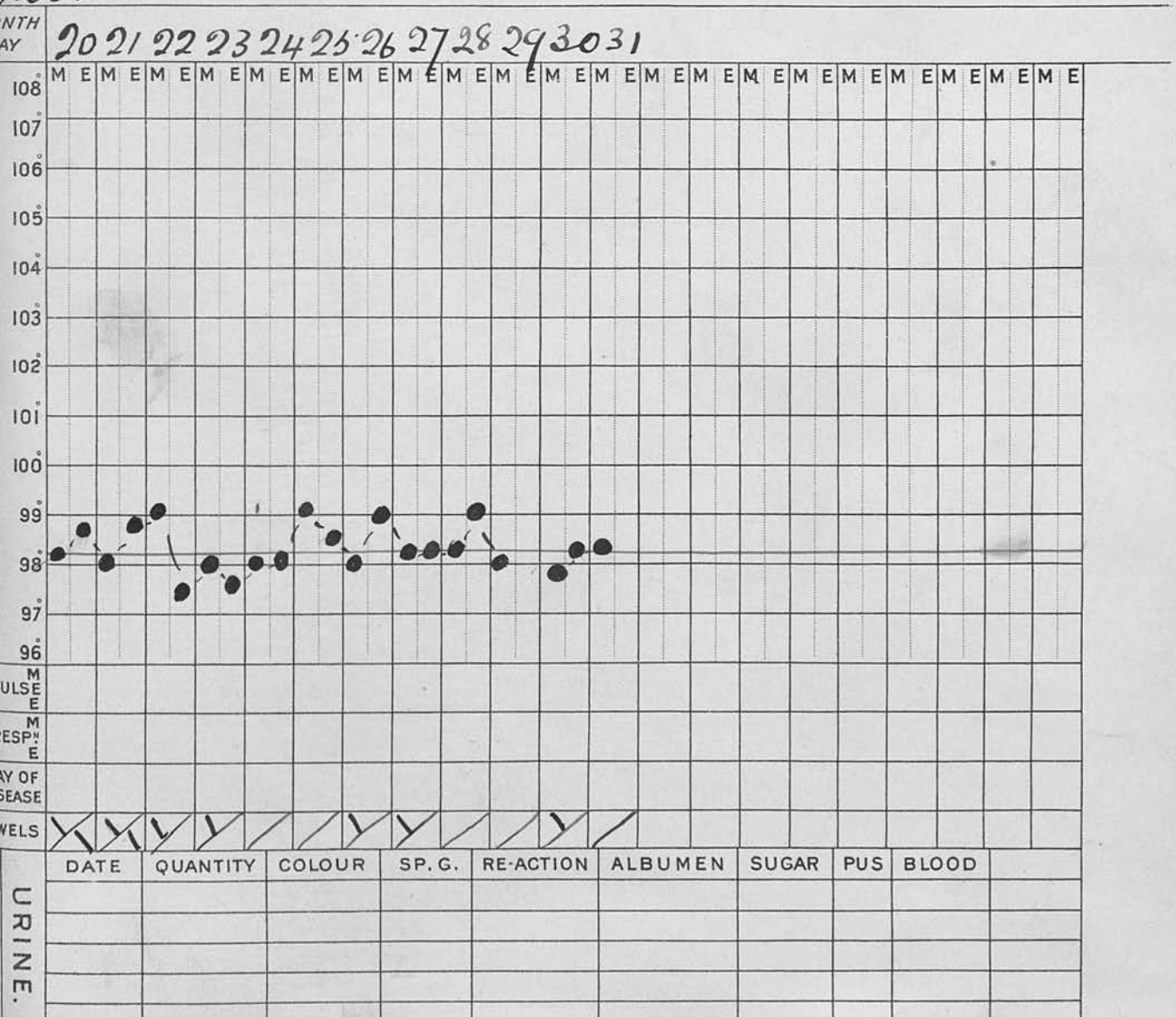
Admitted Nov. 1- 04

Patients Name Joseph Cooper Age 7

Disease

Discharged

Oct.



URINE.

DATE	QUANTITY	COLOUR	SP. G.	RE-ACTION	ALBUMEN	SUGAR	PUS	BLOOD	

86

egister.

DR. TURNER.

WARD. 6

Barker Violet

Recomd. by

7 Occupn.

ce 19 Haymarket

Date of { Admission Dec 1. 1904
Discharge February. 18. 05.

DISEASE.

ingle, or Widod.

Entire

Result C.

	TREATMENT.	DATE.	DIET.
04.	℞ Ammon Carb. ℥iij Vin Ipecac mx Syrup Tolut mx Aq Camph ad ℥j T.D.S.	1.12.04	Milk ℗ iij
		14.12.	℗ ij
	Lotio Boracis.	21.12.	Beef Tea.
	Inj Hyoscin gr. 1/100 h.d.s.	21.12.	Spt Vini Gallici ℥j O.O.S.
s.	Mist. et Bromural. ℥j. i.d.s - p.c.	22.12.	Valentines Meat Juice. Chicken Tea.
os.	℥ij		Rusks.
		30.12	Bread & Butter Milk Tea.
		5.1.05.	Fish
		11.1.05.	Medium

Admitted
Dec: 1. 04

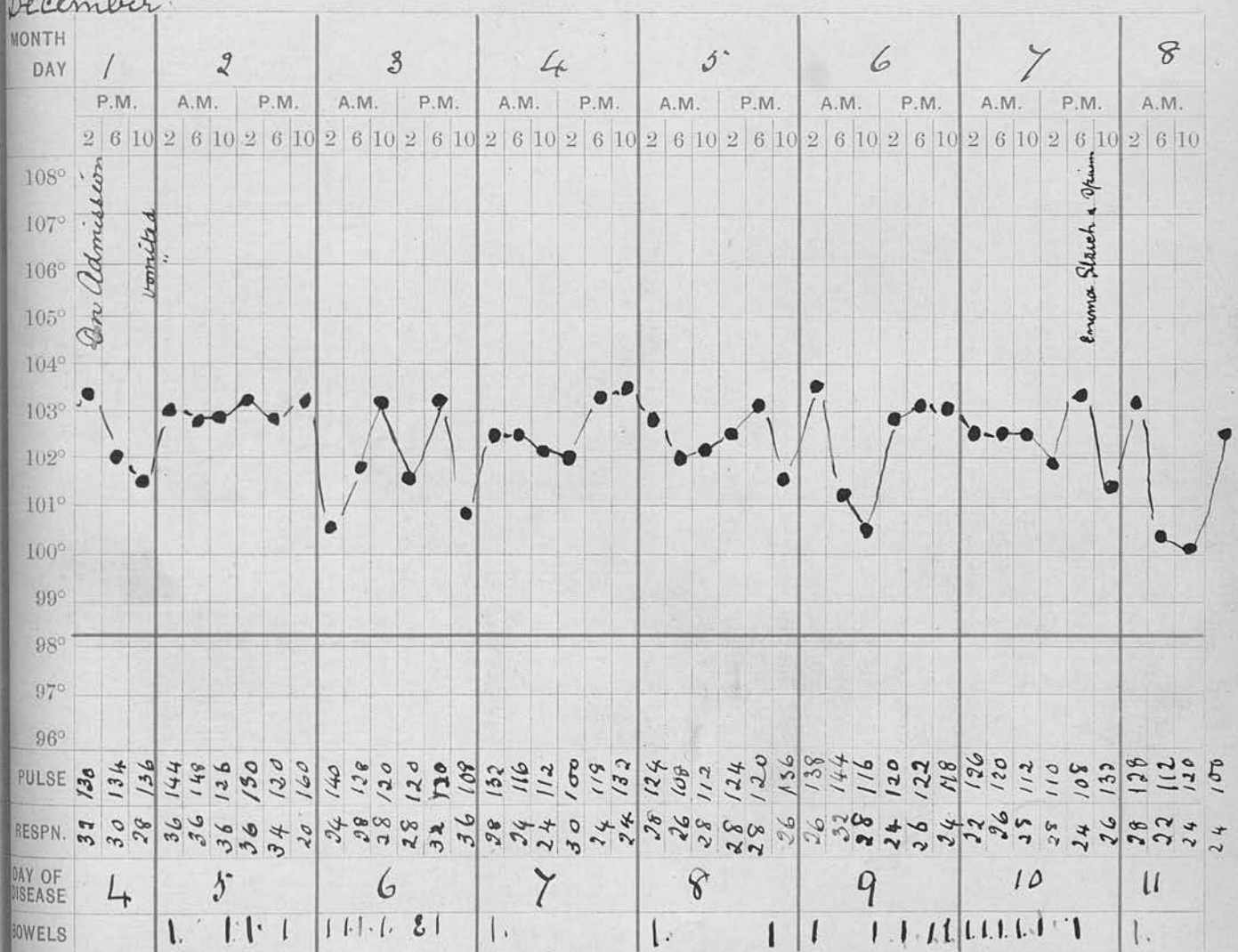
Patient's Name Violet Barker

Age 87 Discharged

Disease

Continued Nov 27th (?)

December


MONTH
DAY
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3
4
5
6
7
8
P.M.
A.M.
P.M.
A.M.
P.M.
A.M.
P.M.
A.M.
P.M.
A.M.
P.M.
A.M.
2 6 10 2 6 10 2 6 10 2 6 10 2 6 10 2 6 10 2 6 10 2 6 10 2 6 10 2 6 10 2 6 10 2 6 10 2 6 10 2 6 10 2 6 10 2 6 10
108°
107°
106°
105°
104°
103°
102°
101°
100°
99°
98°
97°
96°
On Admission
Vomited
Enema Starch & Opium
PULSE
130 134 136 144 148 126 150 120 160 140 128 120 120 130 108 132 116 112 100 119 132 124 108 112 124 120 136 138 144 116 120 122 118 126 120 112 110 108 132 128 112 120 100
RESPN.
32 30 28 36 36 36 36 34 20 24 28 28 28 32 36 28 24 24 30 24 24 28 26 28 28 28 26 26 32 28 24 26 24 32 26 25 28 24 26 28 22 24 24
DAY OF DISEASE
4
5
6
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9
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11
BOWELS
1. 1 1 1

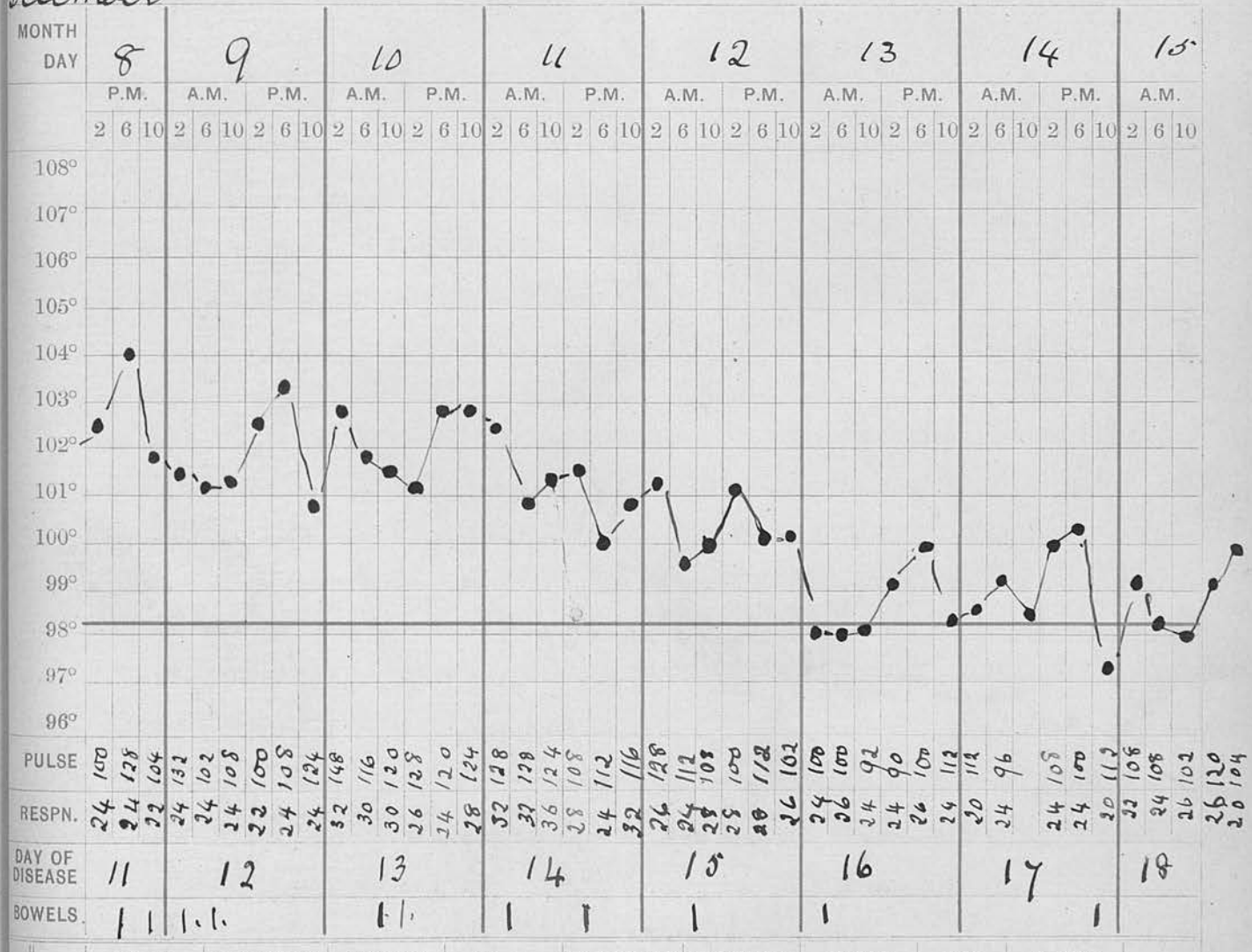
Admitted
Dec 1. 04

Patient's Name Violet Barker

Age 7. Discharged

Disease

December



URINE.

DATE.	QUANTITY	COLOUR	SP. G.	RE-ACTION	ALBUMEN	SUGAR	PUS	BLOOD

2000—10/03—Yorks. Herald.

Admitted
Dec 1. 04

Patient's Name Violet Barker

Age 7

Disease

Discharged

Discharge from Ears.
Abscess in head.

December

MONTH DAY	15	16					17						18						19						20						21						22		
	P.M.	A.M.			P.M.		A.M.			P.M.			A.M.			P.M.			A.M.			P.M.			A.M.			P.M.			A.M.			P.M.			A.M.		
	2 6 10	2 6 10			2 6 10		2 6 10			2 6 10			2 6 10			2 6 10			2 6 10			2 6 10			2 6 10			2 6 10			2 6 10			2 6 10			2 6 10
PULSE	120 104 100	88 148 100			100 104 104		112 108 100			96 100 96			88 100 92			100 98 98			108 124 120			92 100 112			108 98 90			80 100 88			116 98 80			82 90 98.4			93 94 92			96 80
RESPN.	26 20 18	20			24 24 22		24 28 24			24 18 20			24 20 20			24 24 20			18 20 20			20 20 22			24 22 22			22 22 22			18 22 22			20 20 24			20 20 22			22 20
DAY OF DISEASE	18	19					21						22						23						24												21		
BOWELS	1	1.			1					1									-																				

Abscess Opened

Aromatic 3ii 10
" 3ii 12
" 3ii 3
" 3ii 6

URINE.	DATE.	QUANTITY	COLOUR	SP. G.	RE-ACTION	ALBUMEN	SUGAR	PUS	BLOOD

500—10/03—Yorks. Herald.

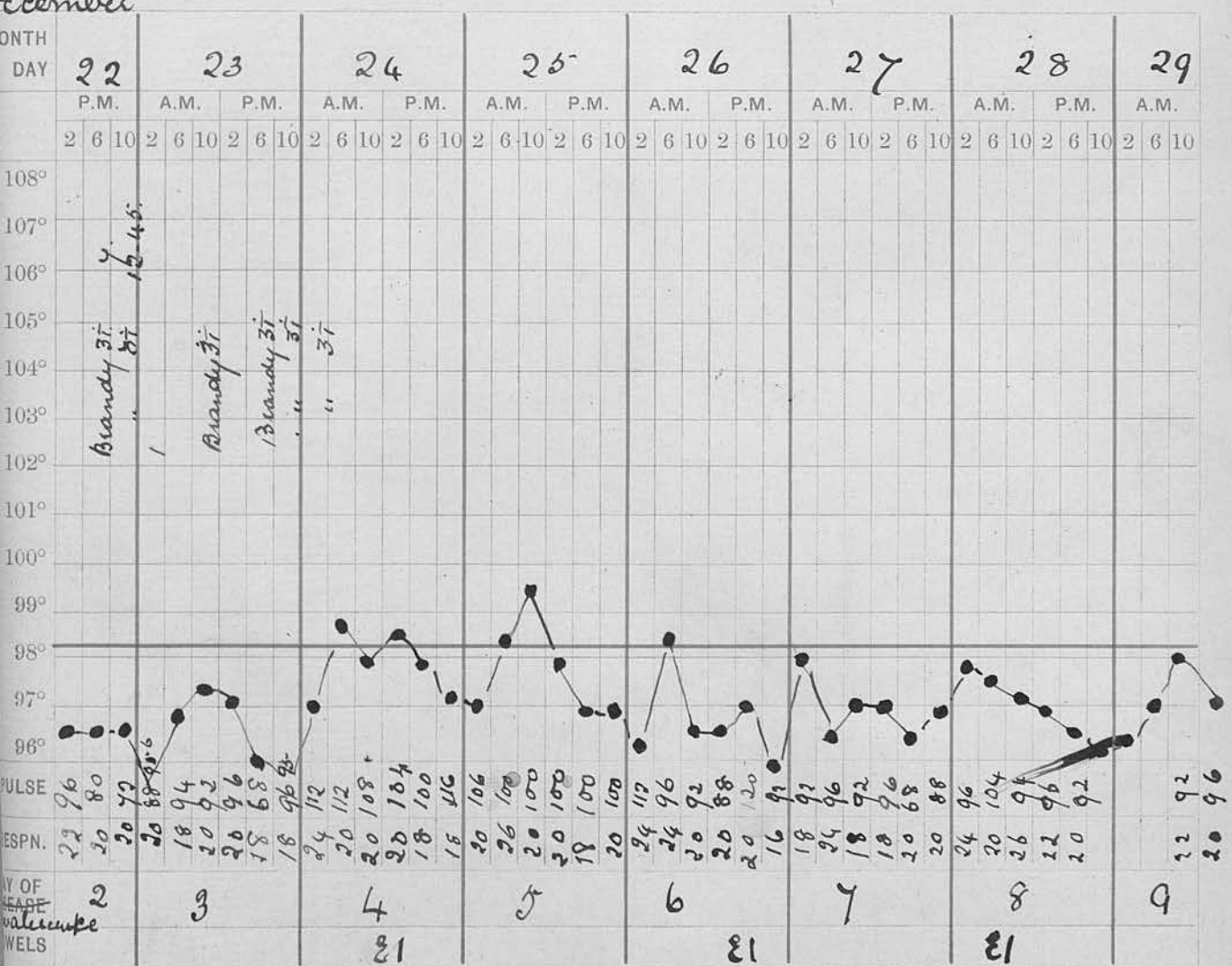
Admitted
Dec 1. 04

Patient's Name Violet Barker

Age 7 Discharged

Disease

December



DATE.	QUANTITY	COLOUR	SP. G.	RE-ACTION	ALBUMEN	SUGAR	PUS	BLOOD

URINE.

Admitted
Dec 1. 04

Patient's Name Violet Barker

Age 7

Discharged

Disease

Dec Jan

| MONTH | | |

Physician Dr. Turner

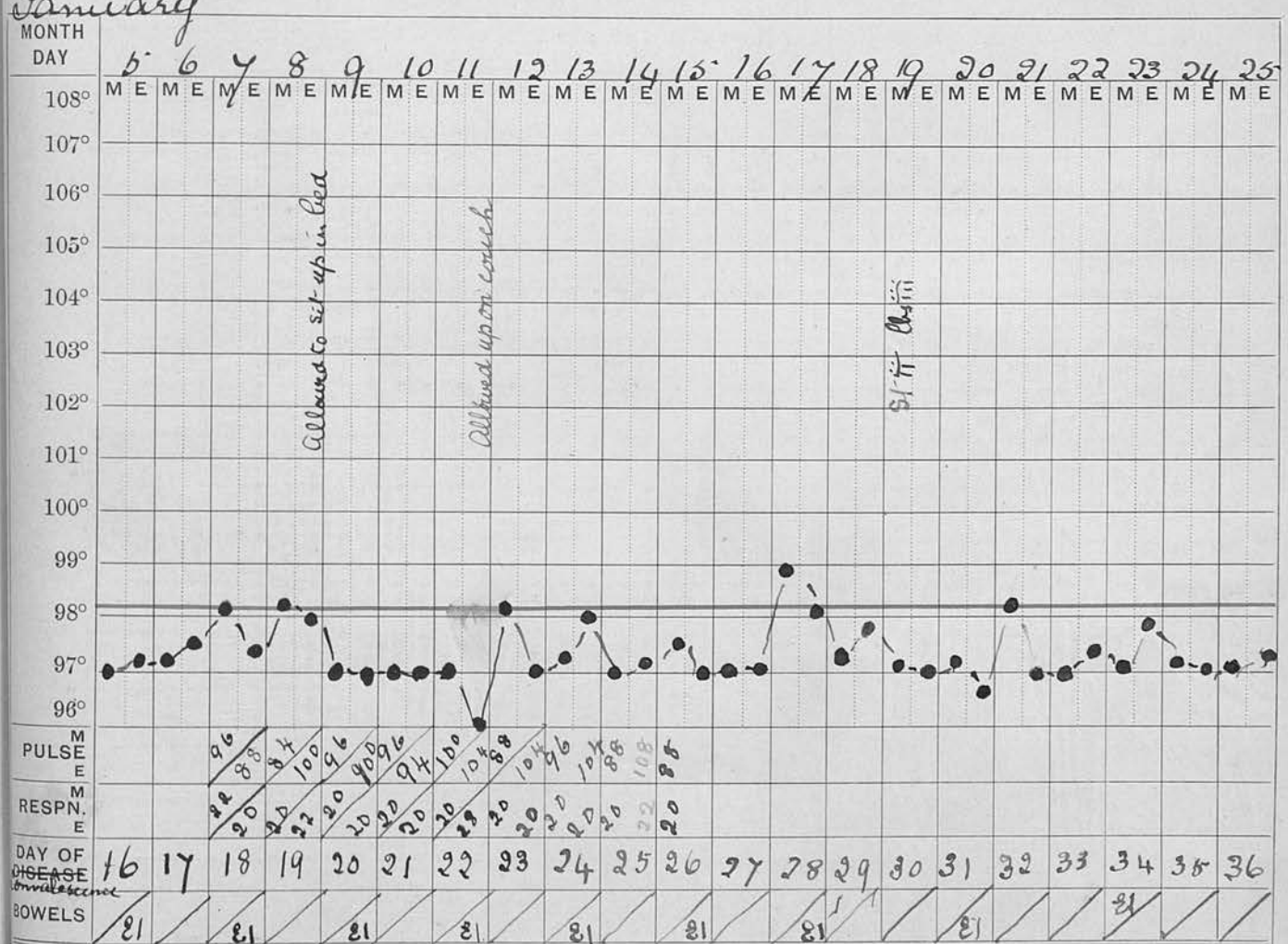
Admitted Dec 1. 04

Patient's Name Violet Barker

Age 7. Discharged

Disease

January



DAY OF DISEASE	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
BOWELS	1		1		1		1		1		1		1			1			1		

URINE.

DATE	QUANTITY	COLOUR	SP. G.	RE-ACTION	ALBUMEN	SUGAR	PUS	BLOOD
14 Jan. 05		Pale Amber	1010	Acid.	No.	No.	No.	No.

1000—10/04—Yorks. Herald.

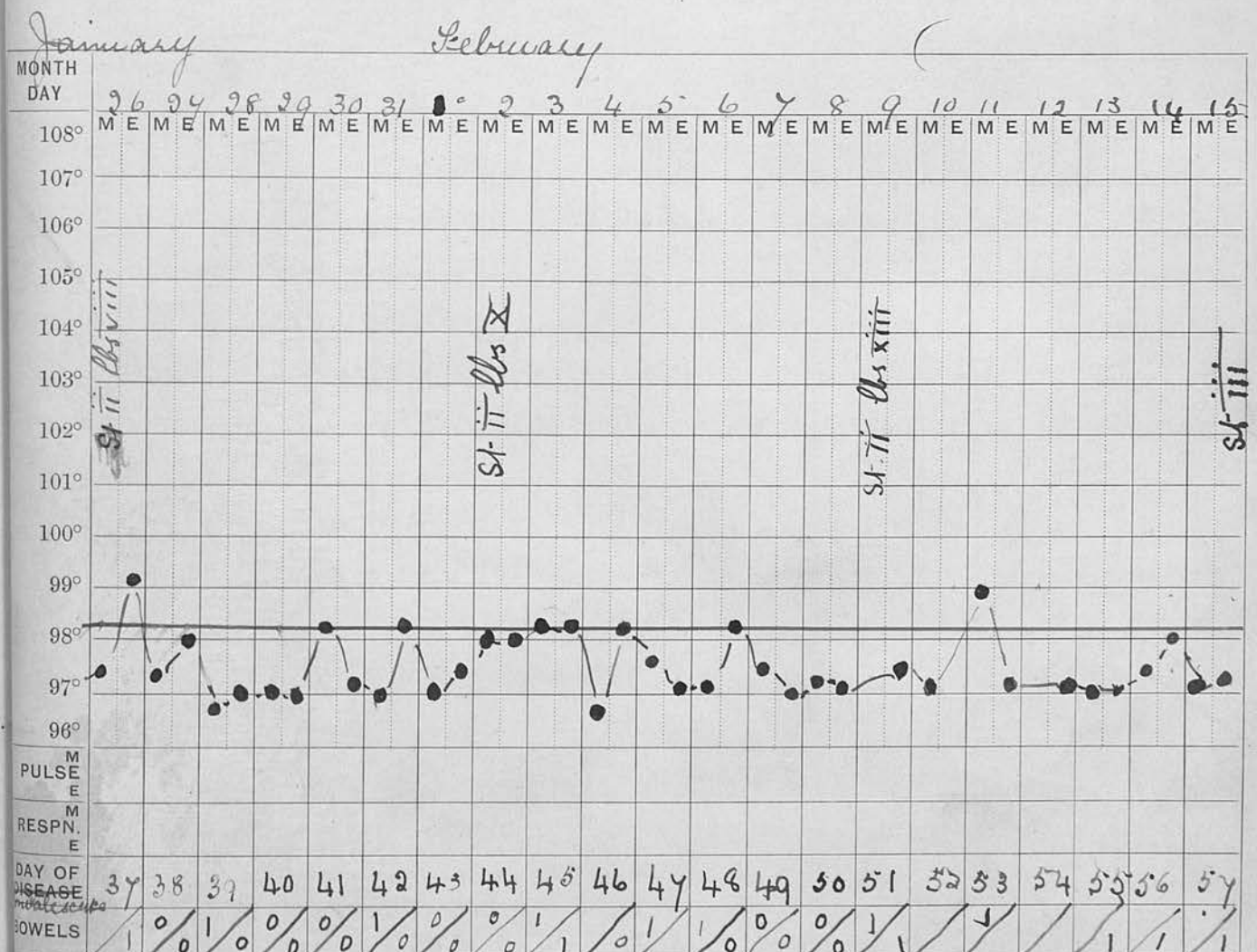
Physician Dr. Turner

Admitted Dec 1-04

Patient's Name Violet Barker

Age 7 Discharged

Disease



URINE.

DATE	QUANTITY	COLOUR	SP. G.	RE-ACTION	ALBUMEN	SUGAR	PUS	BLOOD	

1000—10/04—Yorks. Herald.

1371 In Register. Copy.

DR. PETCH.

WARD. 3

ne Rowson John — Recomd. by G. Layenby

30 Occupn. Flour packer — Date of Admission Dec. 22nd 1904

idence Drummonds Court. Bungate — Discharge Jan. 7. 05 died.

d., ~~Single~~, or ~~Widod~~. — DISEASE. Enteric Fever — Result D.

DATE.	TREATMENT.	DATE.	DIET.
.12.04.	Rx Acetozone gr X Syp Aurantii ℥ j ℈ ss Aq ad ʒ j ℥ iv 3rd hrs every 2 hours Bist Camph Co ℥ ss T.d.s Cold Sponge m et Rx Rep. if T° over 103°F	22.12.	Milk ʒ ij per diem Peptonised Brands Essence Valentines Extract.
.12.04.	Adrenalin Chloride m X Every 4 hours		

Dr. Petch

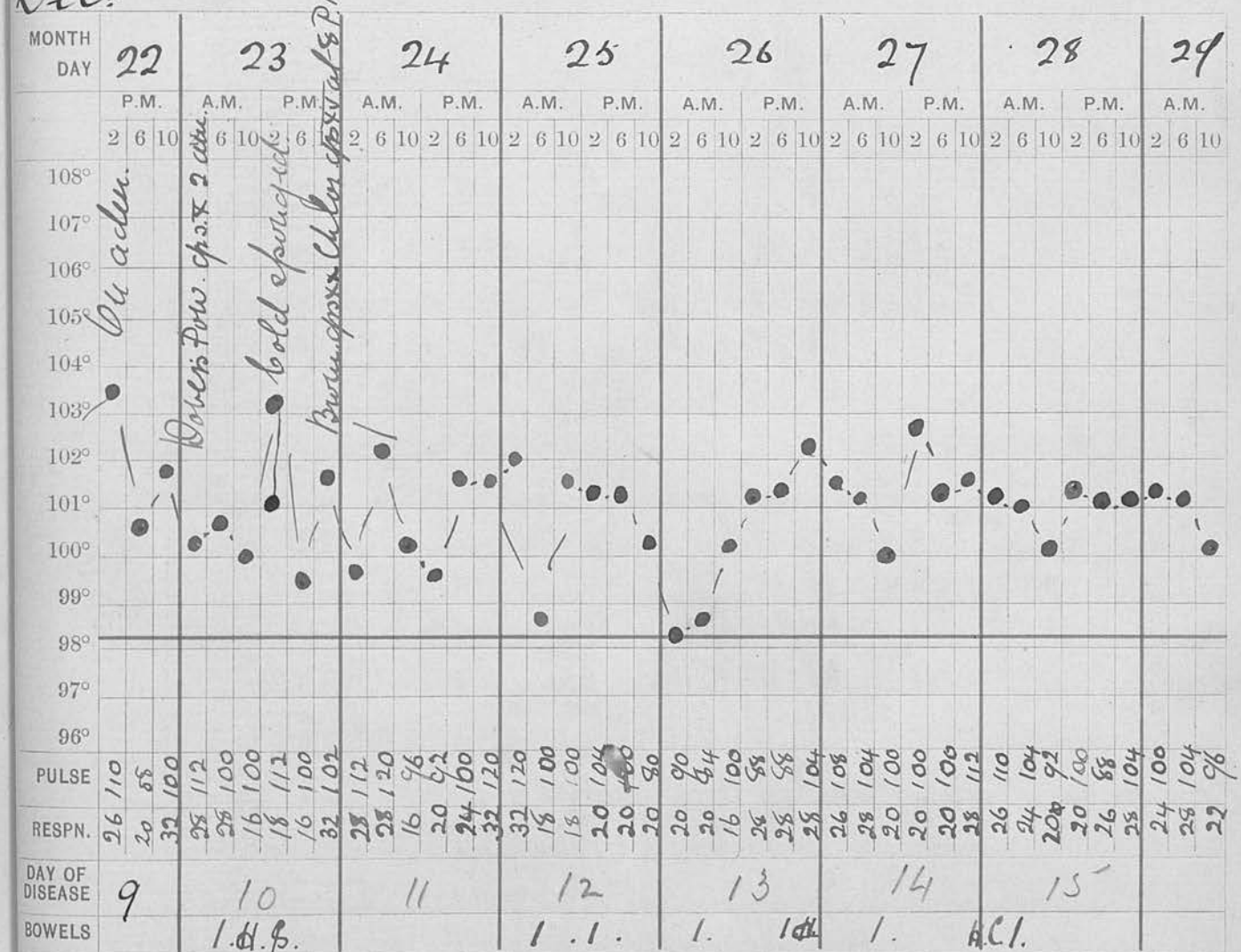
Patient's Name John Rawlson

Disease

Admitted Dec. 22-04

Age 30 Discharged

Dec.



URINE.

DATE.	QUANTITY	COLOUR	SP. G.	RE-ACTION	ALBUMEN	SUGAR	PUS	BLOOD
Dec. 23		Pale	1020	Acid	Re-6			
" 26		Pale	1020	Acid	Re-3			
" 27		Normal	1020	Acid	Re-3			
" 28		Normal	1020	Acid				
" 29	3 L x IV							

2000—10/03—Yorks. Herald.

Dr. Petch

Patient's Name John Rowbotham

Admitted Dec. 22-04.

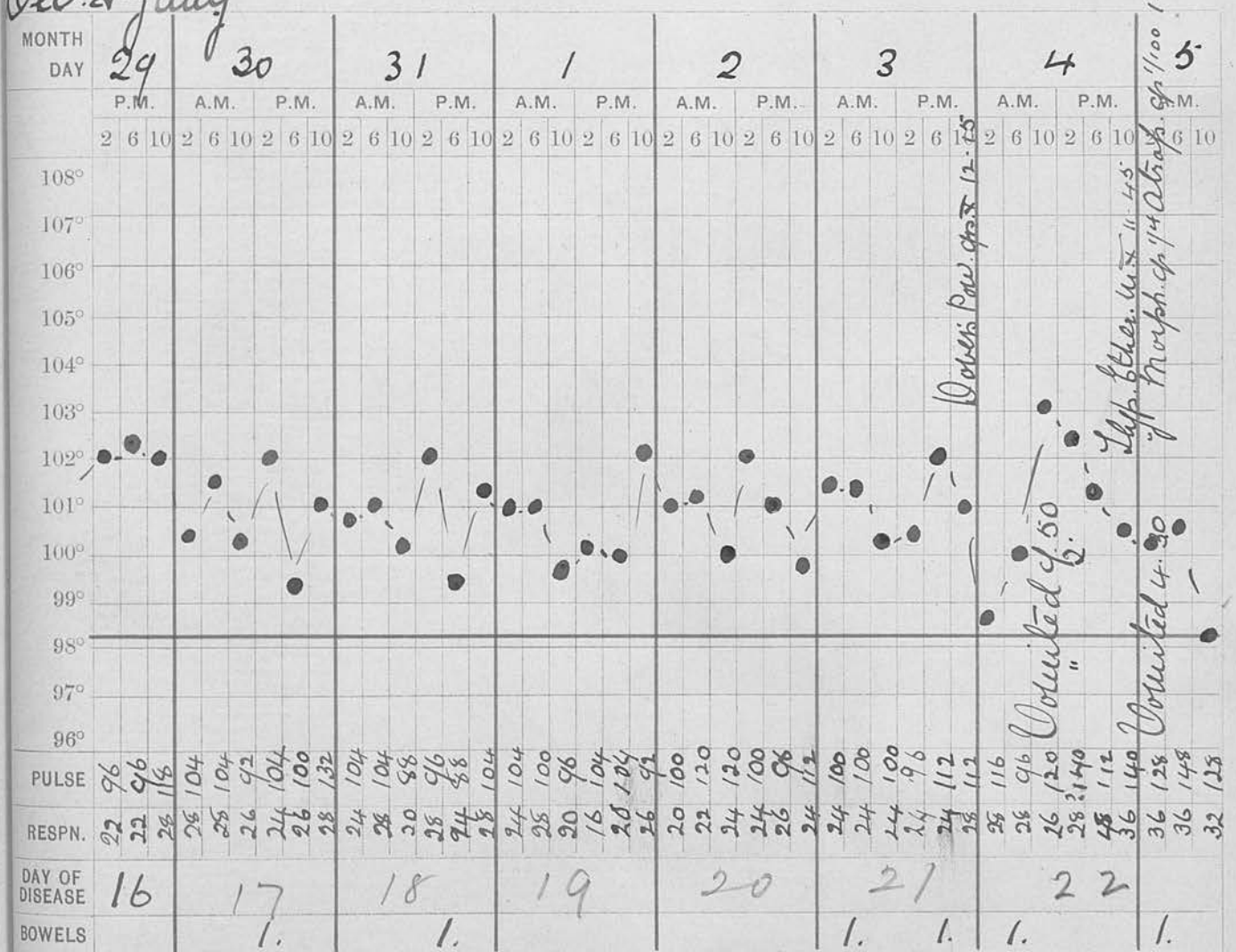
Age 30

Disease

Discharged

Dec. & Jany

Perforation



URINE.

DATE.	QUANTITY	COLOUR	SP. G.	RE-ACTION	ALBUMEN	SUGAR	PUS	BLOOD
Dec. 30	℥XXXIX	Pale	1020	Acid	Re-2			
" 31	℥L	Pale	1020	Acid	Re-2			
Jany 1	℥XLIII	Pale	1015	Acid				
" 2	℥XLII	Pale	1015	Acid	Re-4			
" 3	℥LXIV	Pale	1014	Acid	Re-4			
" 4	℥L	Pale	1014	Acid				
" 5	℥XXVIII	Pale	1018	Acid				

2000—10/03—Yorks. Herald.

Dr. Petch

Patient's Name John Rowlson

Admitted Dec. 22-04

Age 30

Discharged

Disease

Jany

| MONTH DAY | 5 | | | | | | | | 7 | | | | | | | | 8 | | | | | | | | 9 | | | | | | | | 10 | | | | | | | | 11 | | | | | | | | 12 |
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